

CERTIFIED TRANSLATION FROM POLISH

[Page 1]---

[Logo of the Building Research Institute]---

Building Research Institute, PL 00-611 Warszawa, ul. Filtrowa 1, www.itb.pl---

Member of EOTA and UEAtc---

[Logo of EOTA and UEAtc]---

NATIONAL TECHNICAL ASSESSMENT No. ITB-KOT-2019/0940 rev. 1---

This National Technical Assessment was issued in line with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on national technical assessments (Dz. U. [Journal of Laws] of 2016 item 1968) by the Warsaw-based Building Research Institute at the request of:---

ALNOR – Systemy Wentylacji Sp. z o.o., ul. Zwierzyniecka 8b, 00-719 Warszawa---

The National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 is a positive assessment of the performance characteristics of the construction product mentioned below for its intended use:---

Elements of the STRUT system for mounting of installation ducts---

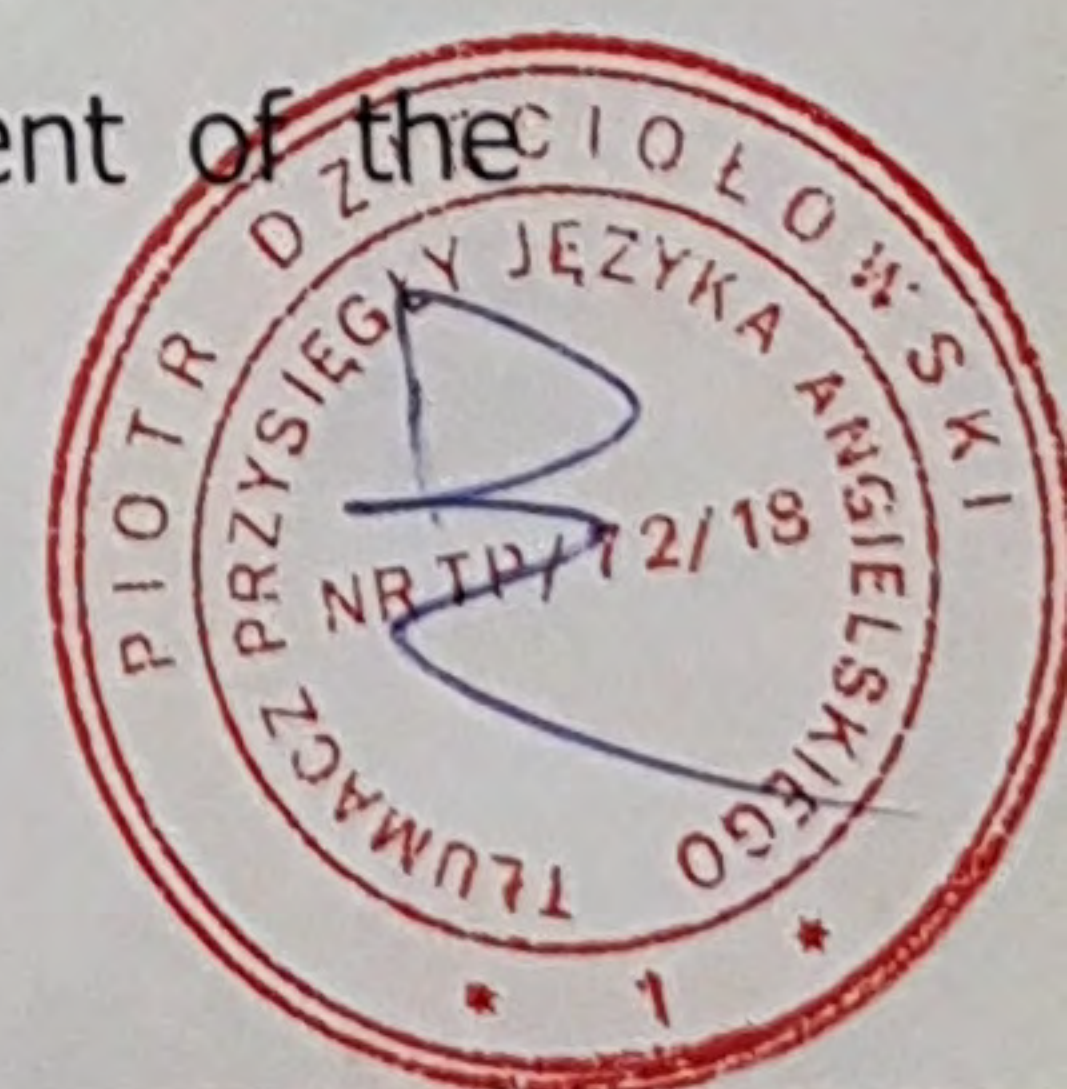
This National Technical Assessment is valid until: May 24, 2024---

[A round seal with the state emblem of the Republic of Poland in the centre and the lettering in the rim: "Building Research Institute"]---

[An oblong seal with the lettering: "Director of the Building Research Institute, dr inż. Robert Geryło"; illegible signature]---

Warsaw, May 24, 2019---

The document of the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 consists of 26 pages, including 3 appendices. The contents of this document may be copied only in whole. Any publication or dissemination in any other form of fragments of the contents of this National Technical Assessment requires a written consent of the



Building Research Institute. The National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 pertains to the products covered with the Technical Approval No. ITB AT-15-9194/2013.---

[Page 2]---

Building Research Institute, ul. Filtrowa 1, 00-611 Warszawa, tel. No. 22 825 04 71, VAT No.: 525 000 93 58; National Court Register No.: 0000158785.---

[Page 3]---

[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 3/26---

1. TECHNICAL DESCRIPTION OF THE PRODUCT---

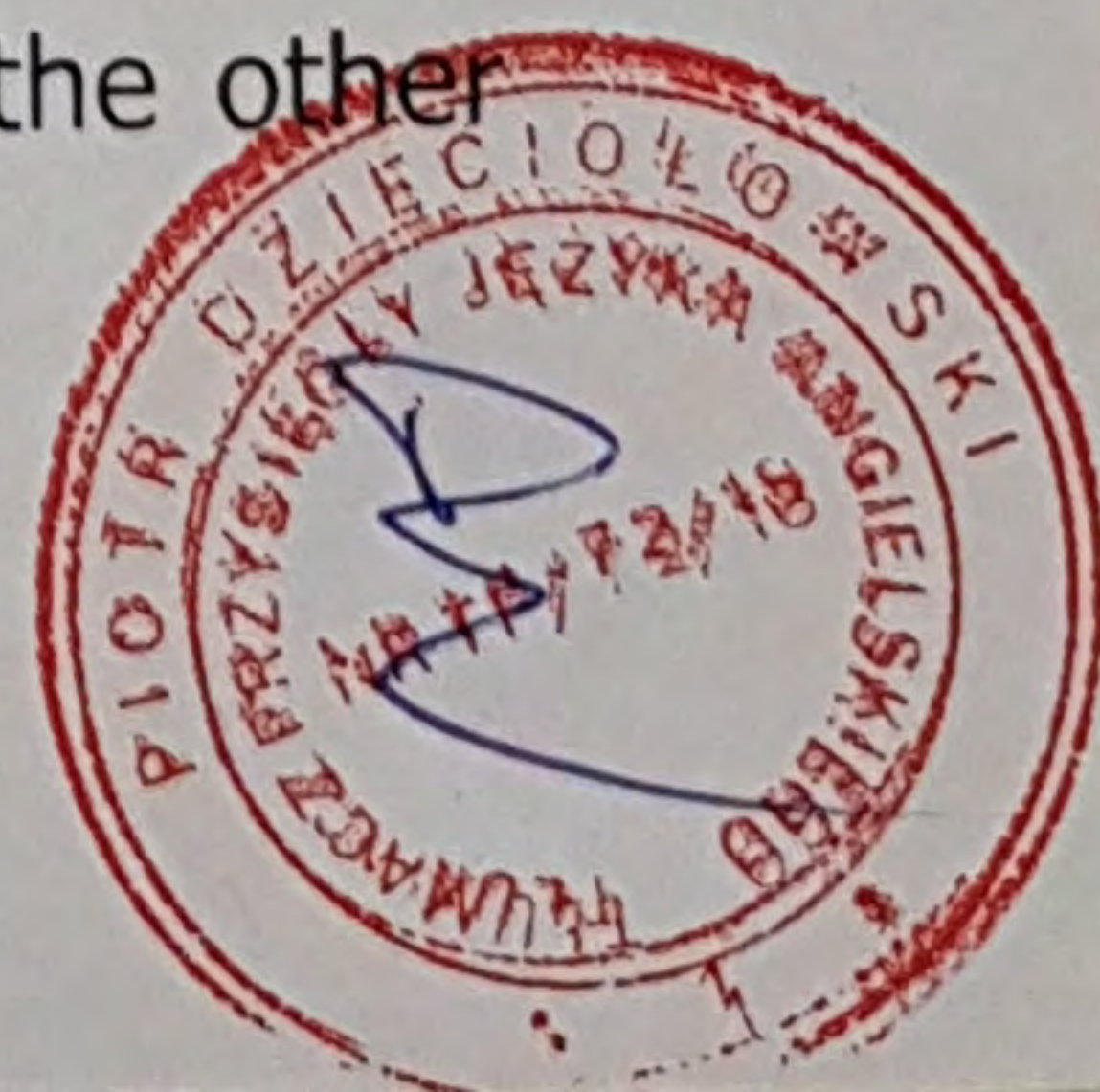
This National Technical Assessment was issued for elements of the STRUT system designed for mounting installation ducts manufactured in Poland by ALNOR – Systemy Wentylacji Sp. z o.o., ul. Zwierzyniecka 8b, 00-719 Warszawa.---

This National Technical Assessment covers the types of products specified by the manufacturer and resulting from the performance characteristics indicated in item 3 as well as the combination of materials and elements.---

This National Technical Assessment covers the following products:---

- mounting rails: LDB (as presented in Fig. A1), LDBST (as presented in Fig. A2) and LDBDT (as presented in Fig. A3),---
- wall supports: W-LDB (as presented in Fig. A4 and A5) and WK-LDB (as presented in Fig. A6 and A7),---
- PG threaded rods (as presented in Fig. A8),---
- SNP slide nuts without a spring (as presented in Fig. A9),---
- SNL and SNKL slide nuts with a spring (as presented in Fig. A10).---

Dimensions of the elements of the STRUT system have been specified in Appendix A. Deviations in terms of the dimensions of the threads correspond to the PN-ISO 965-2:2001 standard. Deviations in terms of the thickness of the steel sheets correspond to the PN-EN 10143:2008 standard. Deviations in terms of the dimensions of the other



elements covered with this National Technical Assessment correspond to the *m* tolerance class, as specified in the PN-EN 22768-1:1999 standard.---

The elements of the STRUT system are made of common steel, carbon steel or structural steel and are protected against corrosion with a Z100 hot-dip galvanizing coating made according to the PN-EN 10346:2015 standard, with a mass of at least 100 g/m² and a nominal thickness of 7 µm, or with an electrogalvanizing coating made according to the PN-EN ISO 2081:2011 or the PN-EN ISO 4042:2001 standard, with a thickness of at least 5 µm.---

The technical description of the materials the elements of the STRUT system are made of has been provided in Appendix B.---

2. INTENDED USE OF THE PRODUCT---

Elements of the STRUT system have been designed for mounting installation ducts within the scope resulting from the performance characteristics specified in item 3.---

Due to the protection against corrosion, elements of the STRUT system should be used in line with the requirements specified in the PN-EN ISO 14713-1:2017 standard.---

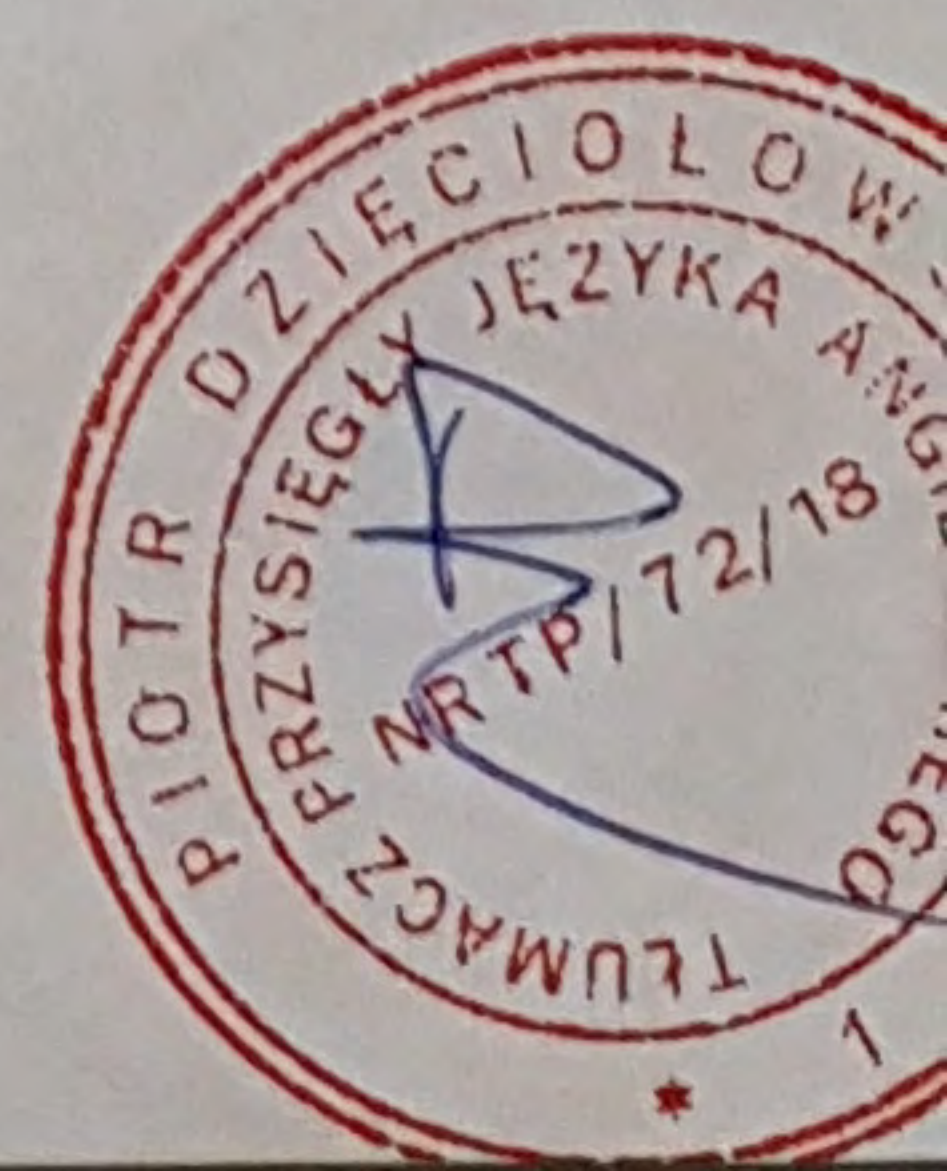
Breaking forces of the threaded rods, test loads of the nuts as well as the characteristic load bearing capacity values of the mounting rails and wall supports of the STRUT system have been specified in Appendix C.---

The design load bearing capacity values of the elements of the STRUT system are determined by dividing the characteristic load bearing capacity values by the safety coefficient equal to:---

- 1.54 in the case of the mounting rails and the wall supports,---
- 2.0 in the case of the slide nuts.---

The threaded rods covered with this National Technical Assessment are used as tension members for transferring the load from the clamping rings of the ducts or from the mounting rails supporting the ducts onto the structural elements fixing these rods to the construction of the building.---

[Page 4]---



4/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

The products covered with this National Technical Assessment should be used in line with the technical design prepared for the given building, taking into account the following:---

- requirements of the Polish standards as well as the technical and construction laws, particularly the Regulation of the Minister of Infrastructure of April 12, 2002 on the technical conditions for building and their location (Dz. U. of 2015 item 1422, as amended),---
- recommendations included in the technical instruction prepared by the manufacturer and delivered to customers,---
- provisions of this National Technical Assessment.---

3. PERFORMANCE CHARACTERISTICS OF THE PRODUCT AND THE METHODS APPLIED FOR THE PURPOSE OF THEIR ASSESSMENT---

3.1. Performance characteristics of the product---

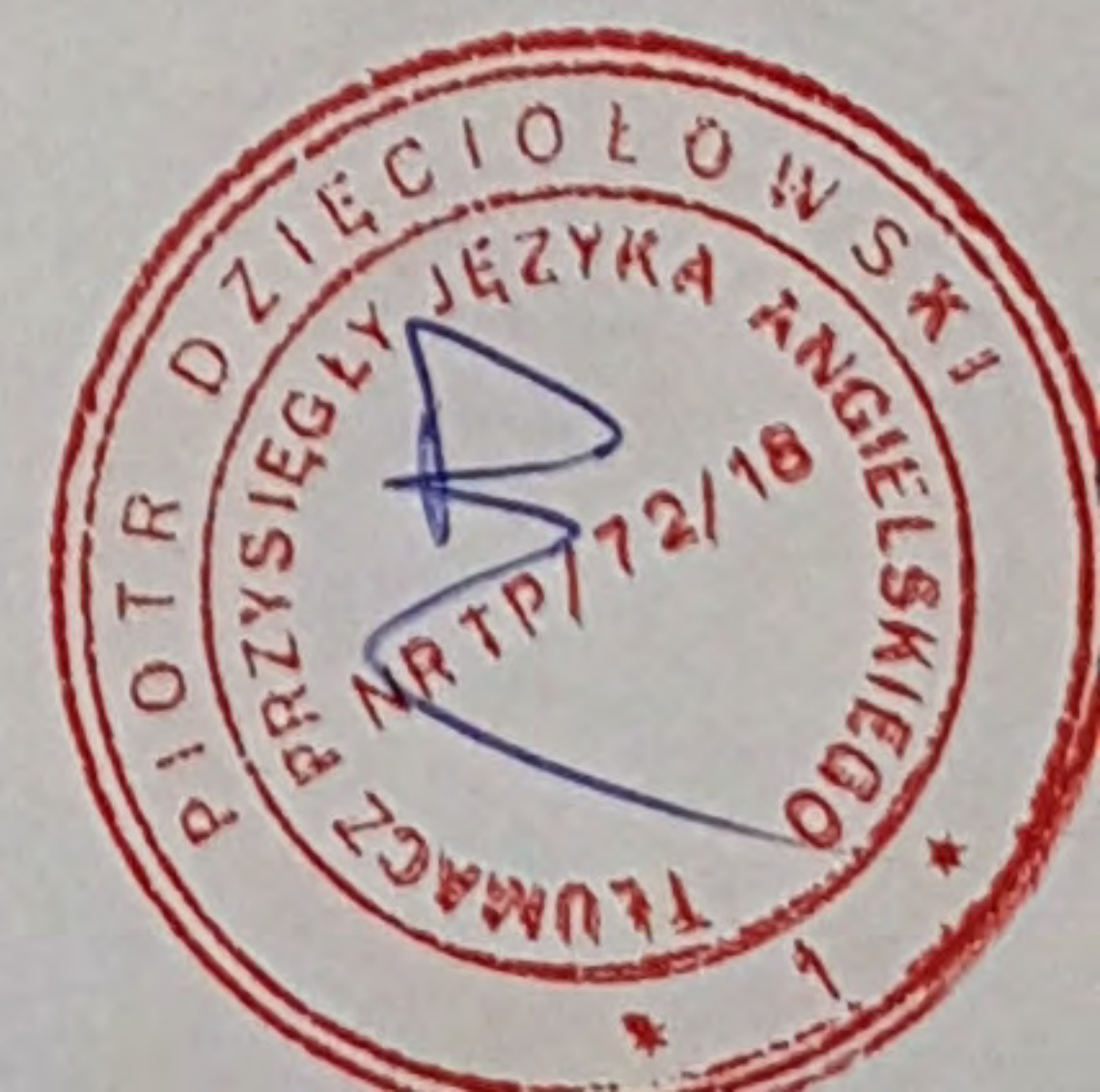
3.1.1. Characteristic and design load bearing capacity values.

Characteristic load bearing capacity values of the mounting rails, the wall supports and the slide nuts correspond to the values specified in tables C1 through C12 in Appendix C. Design load bearing capacity values are determined by dividing the characteristic values by the safety coefficient equal to:---

- 1.54 in the case of the mounting rails and the wall supports,---
- 2.0 in the case of the slide nuts.---

3.1.2. Breaking force values. Breaking forces for the PG threaded rods in a tensile strength test are at least equal to the values specified in table C13 in Appendix C.---

3.1.3. Durability. The electrogalvanizing coating made according to the PN-EN 2081:2011 or the PN-EN ISO 4042:2001 standard with a thickness of at least 5 μm or the Z100 hot-dip galvanizing coating made according to the PN-EN 10346:2015 standard with a nominal thickness of 7 μm ensures the durability of the elements as described in item 2.---



3.2. Methods applied for the purpose of assessment of performance characteristics---

3.2.1.Characteristic load bearing capacity values. Characteristic load bearing capacity values of the mounting rails and the wall supports are tested by applying forces in line with the static diagram presented in tables C1 through C9 (for the mounting rails) or tables C10 and C11 (for the wall supports). As the rail deflection value reaches $f = l/200$ (where l is the spacing between rail supports) or $f = l/100$ (where l is the length of the support) – the test load should be removed and its value recorded. Permanent deformation of the rails and the wall supports, once the load has been removed, should not exceed 0.2 mm. Characteristic load bearing capacity values of the slide nuts are tested by applying forces in line with the conditions of use of the products, according to table C12, by applying the ultimate limit state criterion (rupture force). The characteristic values are determined through the statistic method, by adopting a 0.05 normal distribution quantile.---

3.2.2.Breaking forces. Breaking forces of the threaded rods are tested according to the PN-EN ISO 898-1:2013 standard. The forces are measured with a device offering the range suitable for---

[Page 5]---

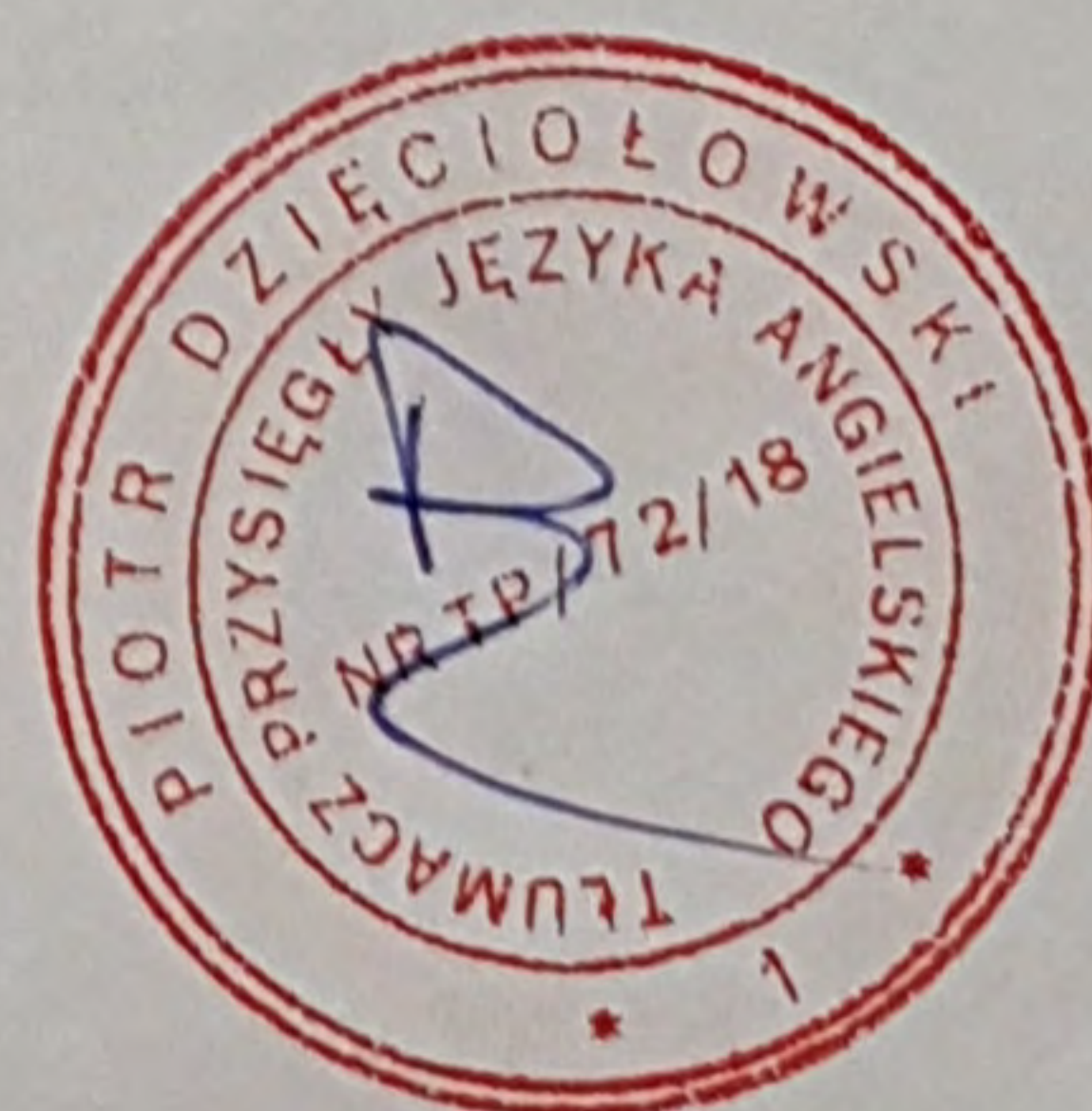
[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 5/26---

the expected value of the breaking force and the option to increase the force in a constant and steady manner until the breaking point is reached.---

3.2.3.Durability. The thickness of the zinc coating is tested according to the PN-EN ISO 2178:2016 or the PN-EN ISO 3497:2004 standard.---

4. PACKAGING, TRANSPORT AND STORAGE AS WELL AS MARKING OF THE PRODUCT---



The products covered with this National Technical Assessment should be delivered in Manufacturer's original packaging and should be stored and transported in such a manner, as to make sure their performance characteristic remain unchanged.---

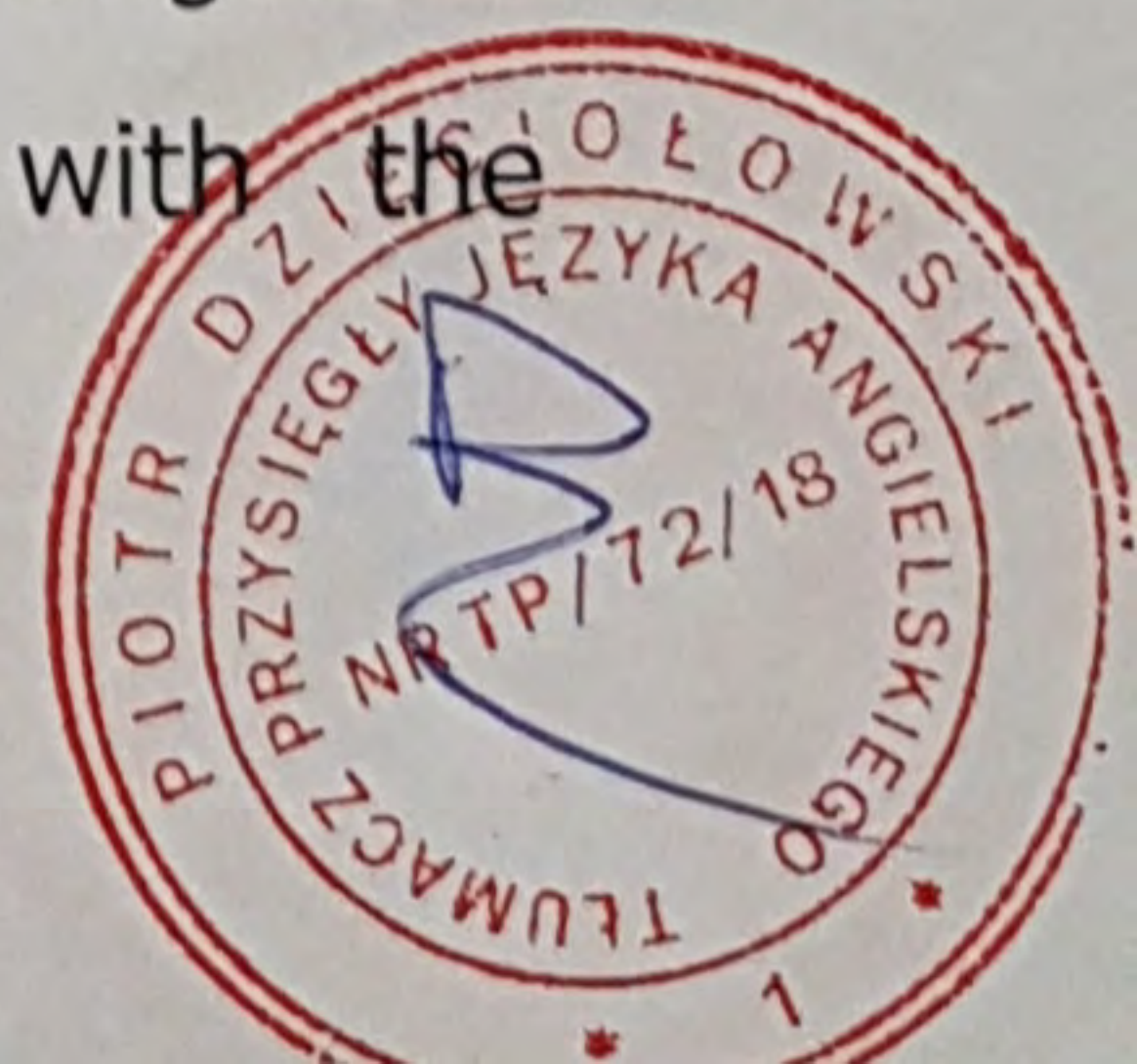
The method of marking the product with a construction mark should be consistent with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on the method of declaring the performance of construction products and the method of marking them with a construction mark (Dz. U. of 2016 item 1966, as amended).---

The following information should be provided alongside a construction mark placed on a construction product:---

- two final digits of the year in which the construction mark was placed on the construction product for the first time;---
- name and address of the seat of the manufacturer or an identification mark which enables unambiguous identification of the name and address of the seat of the manufacturer;---
- name and marking of the type of the construction product;---
- number and year of issue of the national technical assessment based on which performance characteristics were declared (ITB-KOT-2019/0940 rev. 1);---
- number of the national declaration of performance characteristics;---
- level or class of the declared performance characteristics;---
- URL of the manufacturer's website in the event the national declaration of performance characteristics is available on such a website.---

Where applicable, a material safety data sheet and/or information on dangerous substances contained in the construction product, referred to in Article 31 or 33 of the Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, should be provided or rendered available alongside the national declaration of performance characteristics.-

Additionally, the marking of the construction product, classified as a dangerous mixture according to the REACH regulation, should be consistent with the



requirements of the Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (CLP), amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006.---

[Page 6]---

6/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE CHARACTERISTICS---

5.1. The national system for the assessment and verification of constancy of performance characteristics---

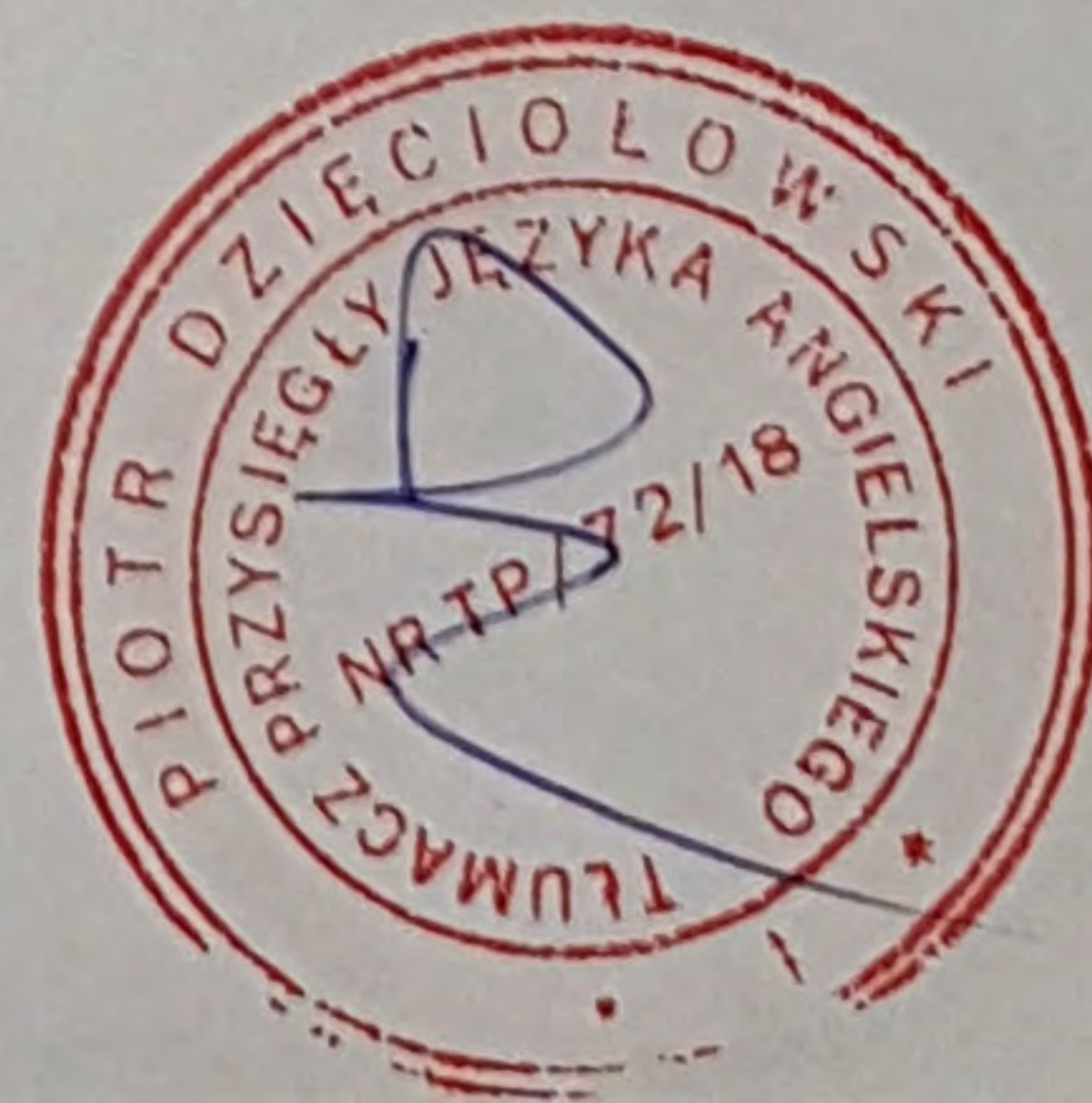
In line with the Regulation of the Minister of Infrastructure and Construction of November 17, 2016 on the method of declaring the performance of construction products and the method of marking them with a construction mark (Dz. U. of 2016 item 1966, as amended), system 3 for the assessment and verification of constancy of performance characteristics shall apply.---

5.2. Type examination---

Performance characteristics, assessed in item 3, shall be deemed product type examination until there is a change in terms of the raw materials, constituents, production line or the production plant.---

5.3. On-site production control---

There should be an on-site production control system in place in the manufacturer's production plant. All elements of this system, requirements and provisions, as adopted by the manufacturer, should be documented in a systematic manner, in the form of rules and procedures, including the records of conducted tests. The on-site production control should be suitable for the production technology and should ensure maintaining the declared performance characteristics of the product in mass production.---



The on-site production control encompasses the specification as well as examination of raw materials and constituents, control and tests within the production process as well as check tests (according to item 5.4) conducted by the manufacturer in line with the adopted test schedule and according to the rules and procedures set in the documentation for the on-site production control.---

Production control results should be systematically recorded. Registry entries should confirm that the products comply with the criteria for the assessment and verification of constancy of performance characteristics. Particular products or product batches as well as production details related to the same must be fully identifiable and reproducible.---

5.4. Check tests---

5.4.1. Testing schedule. The testing schedule shall include:---

- a) current tests,---
- b) periodical tests.---

5.4.2. Current test. Current tests shall include examining the following:---

- a) shape and dimensions,
- b) thickness of the zinc coating.---

5.4.3. Periodical tests. Periodical tests shall include examining the following:--

- a) characteristic load bearing capacity of the rails and the supports,---
- b) breaking forces of the threaded rods.---

[Page 7]---

[Logo of the Building Research Institute]---

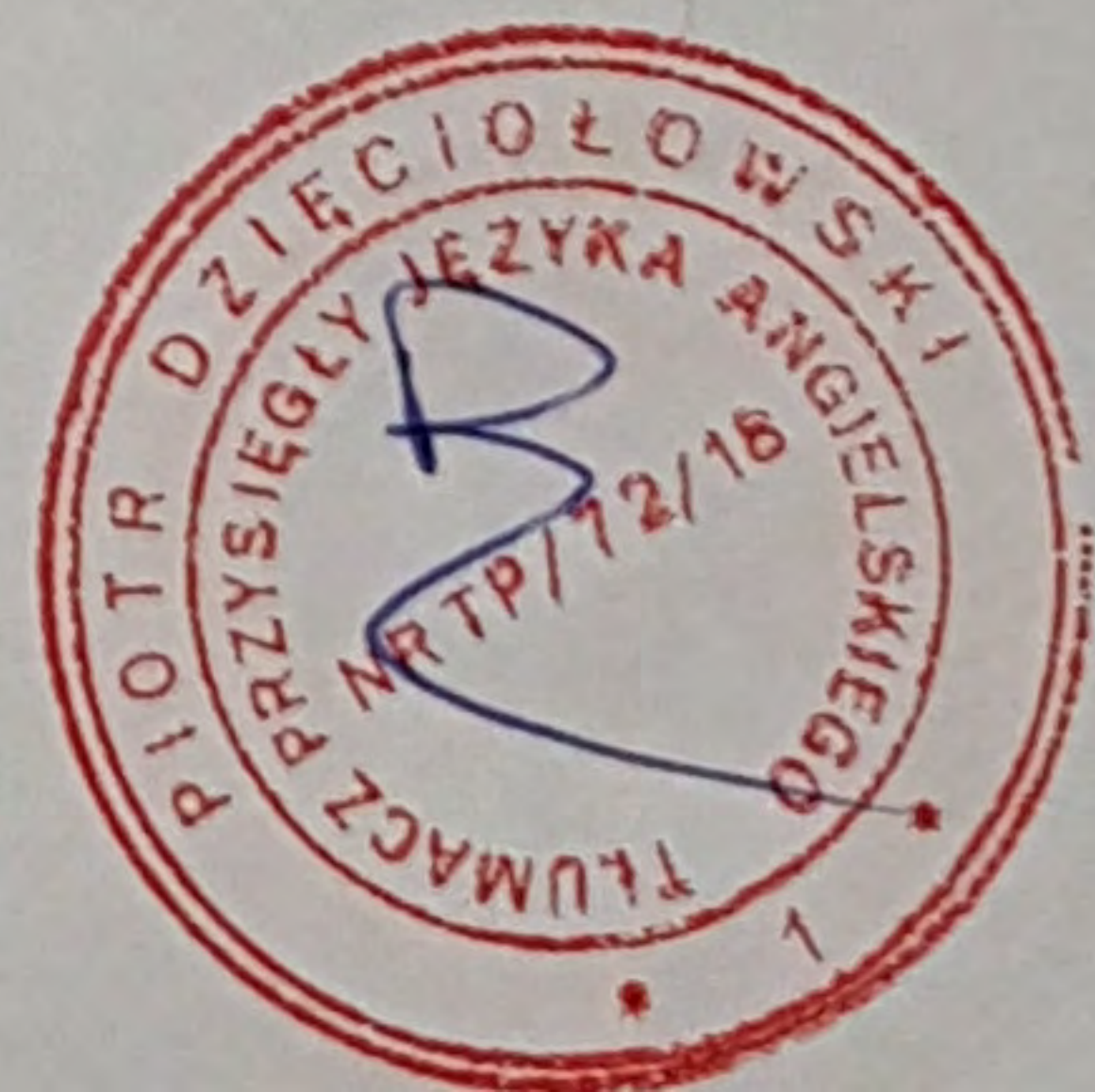
ITB-KOT-2019/0940 rev. 1; 7/26---

5.5. Testing frequency---

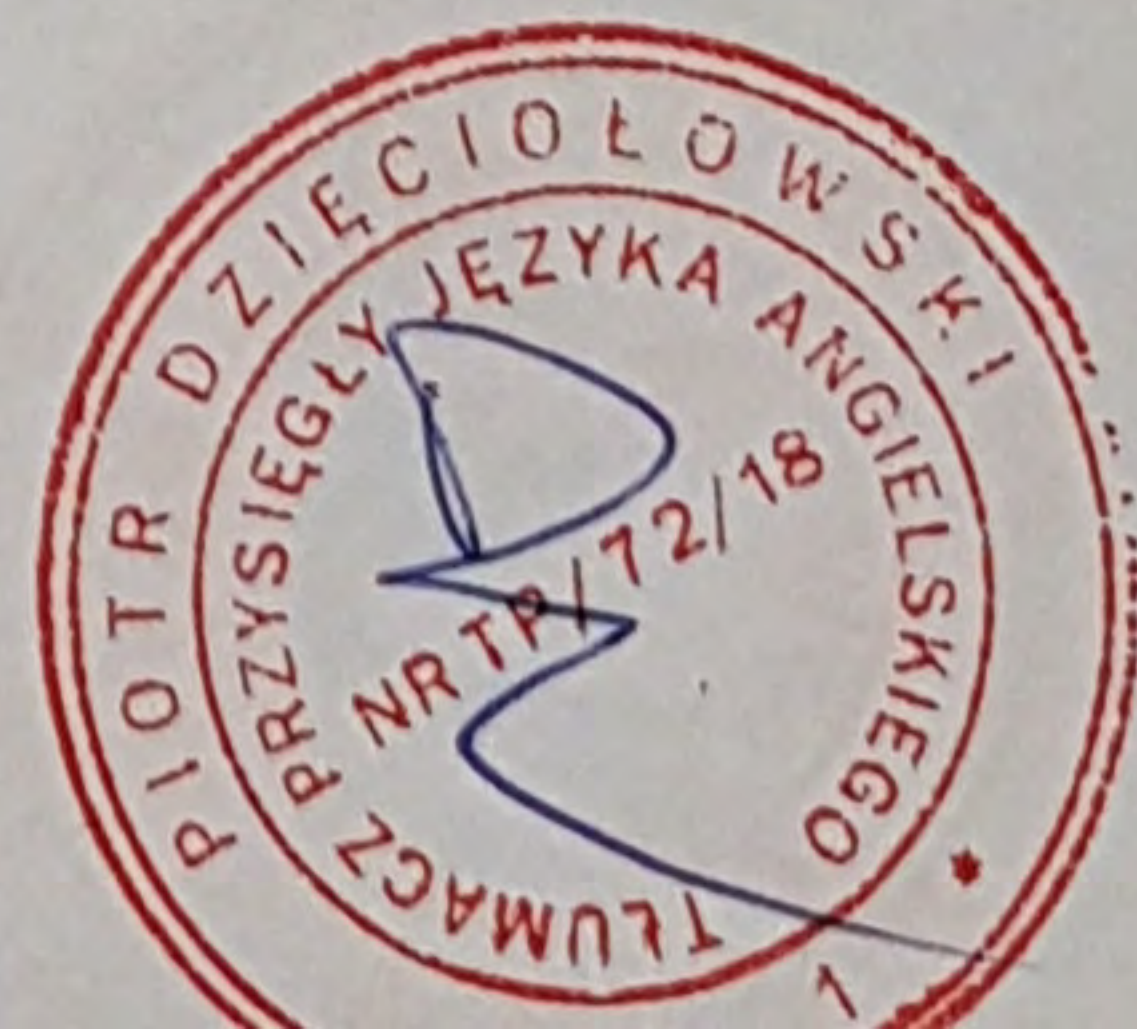
Current tests should be conducted in line with the adopted testing schedule and at least for each batch of products. The volume of a product batch should be specified in the documentation for the on-site production control.---

Periodical tests should be conducted at least every 3 years.---

6. NOTE---



- 6.1.** The National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 constitutes a positive assessment of the performance characteristics of the essential characteristics of the STRUT system elements which, in line with the intended use resulting from the provisions of the Assessment, affect the meeting of the basic requirements by the buildings, where the product will be used.---
- 6.2.** The National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 is not a document authorising the marking of the product with a construction mark. In line with the Act on construction products of April 16, 2004 (Dz. U. of 2019, item 266), products covered with this National Technical Assessment may be marketed or rendered available on the domestic market, provided their manufacturer has assessed and verified the constancy of their performance characteristics, prepared a national declaration of their performance characteristics in line with the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 and marked the products with a construction mark in line with the applicable laws.---
- 6.3.** The National Technical Assessment No. ITB-KOT-2019/0940 rev. 1 does not infringe the rights resulting from the laws on the protection of industrial property and particularly from the Act of June 30, 2000 – Industrial Property Law (Dz. U. of 2017, item 776, as amended). Securing these rights shall be the responsibility of the users of this National Technical Assessment issued by the Building Research Institute.---
- 6.4.** By issuing this National Technical Assessment, the Building Research Institute assumes no liability for any infringement of exclusive and acquired rights.---
- 6.5.** The National Technical Assessment shall not release the manufacturer of the products from being responsible for their suitable quality and contractors from being responsible for their adequate use.---
- 6.6.** The validity of the National Technical Assessment may be extended for successive periods of time, not longer than 5 years.---



8/26; ITB-KOT-2019/0949 rev. 1---

[Logo of the Building Research Institute]---

7. A LIST OF DOCUMENTS USED IN THE COURSE OF THE PROCEDURE---

7.1. Reports, test reports, assessments and classifications---

- 1) Test report No. LZE01-03186/18/Z00NZE. STRUT assembly products for suspending ducts and installation elements, Laboratory of Construction Elements of the Building Research Institute, Poznań.---
- 2) Test report No. LOK01-0991/13/Z00OSK. Products for suspending ventilation and installation elements of the STRUT assembly system, Laboratory of Fasteners and Construction Products – LOK, Silesian Division of the Building Research Institute, Katowice.---
- 3) Technical Assessment No. OSK01-0991/13/Z00OSK regarding STRUT system mounting rails, rev. 2, Department of Elements of Building Structures and Construction on Mining Areas, Silesian Division of the Building Research Institute, Katowice.---

7.2. Reference standards and documents---

PN-EN 10025-2:2007 *Hot rolled products of structural steels. Part 2: Technical delivery conditions for non-alloy structured steels---*

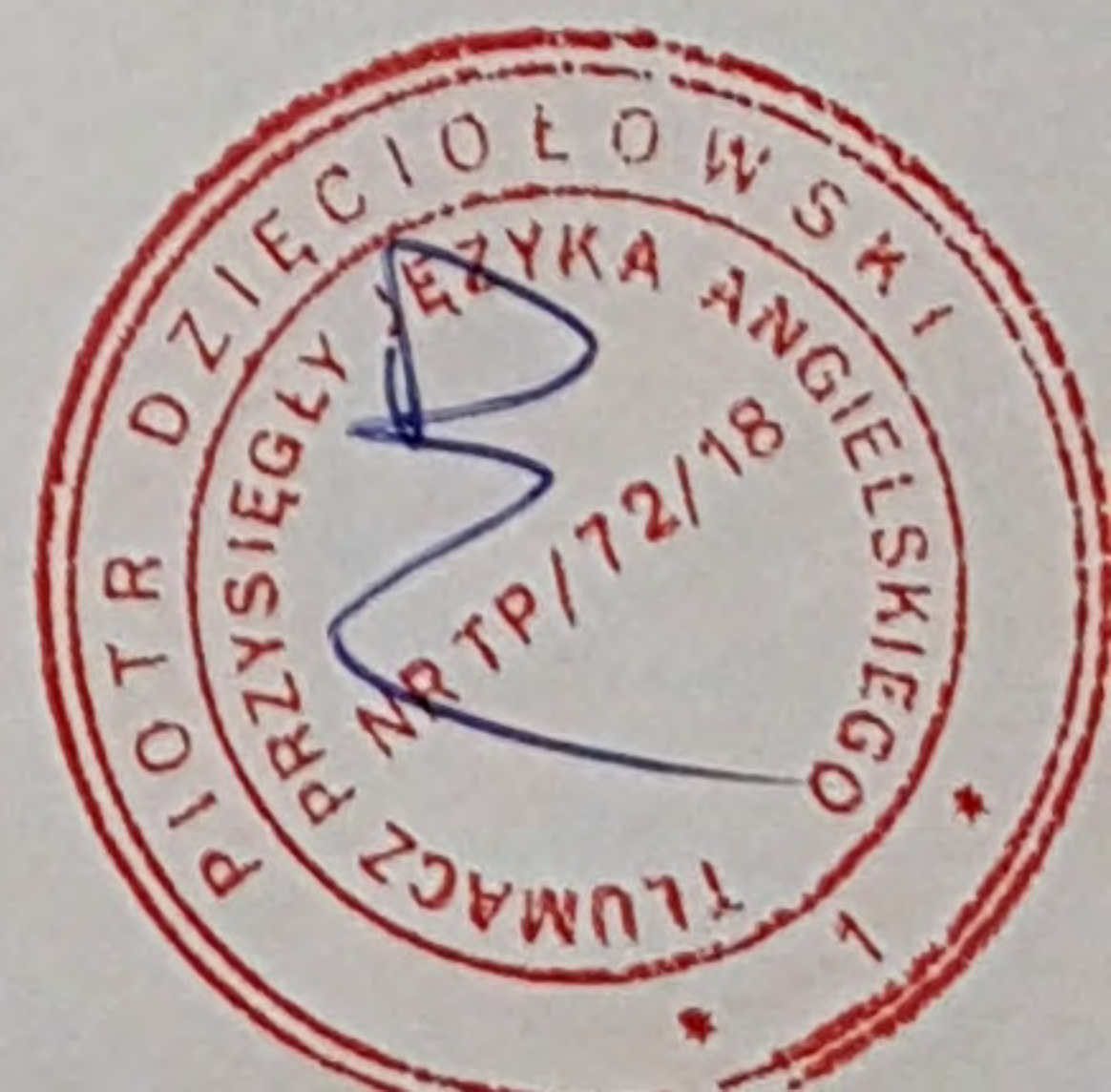
PN-EN 10143:2008 *Continuously hot-dip coated steel sheet and strip. Tolerances on dimensions and shape---*

PN-EN 10346:2015 *Continuously hot-dip coated steel flat products for cold forming. Technical delivery conditions---*

PN-EN 10270-1+A1:2017 *Steel wire for mechanical Springs. Part 1: patented cold drawn unalloyed spring steel wire---*

PN-EN 22768-1:1999 *General tolerances. Tolerances for linear and angular dimensions without individual tolerance indications---*

PN-EN ISO 898-1:2013 *Mechanical properties of fasteners made of carbon steel and alloy steel. Part 1: bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread---*



PN-EN ISO 2081:2011 *Metallic and other inorganic coatings. Electroplated coatings of zinc with supplementary treatments on iron or steel---*

PN-EN ISO 2178:2016 *Non-magnetic coatings on magnetic substrates. Measurement of coating thickness. Magnetic method---*

PN-EN ISO 3497:2004 *Metallic coatings. Measurement of coating thickness. X-ray spectrometric methods---*

PN-EN ISO 4042:2001 *Fasteners. Electroplated coatings---*

PN-EN ISO 14713-1:2017 *Zinc coatings. Guidelines and recommendations for the protection against corrosion of iron and steel in structures. Part 1: General principles of design and corrosion resistance---*

PN-ISO 965-2:2001 *ISO general-purpose metric screw threads. Tolerances - Part 2: limits of sizes for general purpose external and internal screw threads. Medium quality---*

AT-15-9194/2013 *STRUT system assembly products for suspending ducts and installation elements---*

[Page 9]---

[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 9/26---

APPENDICES---

Appendix A. Elements of the STRUT system – dimensions; p. 10---

Appendix B. Technical description of materials elements of the STRUT system are made of; p. 16---

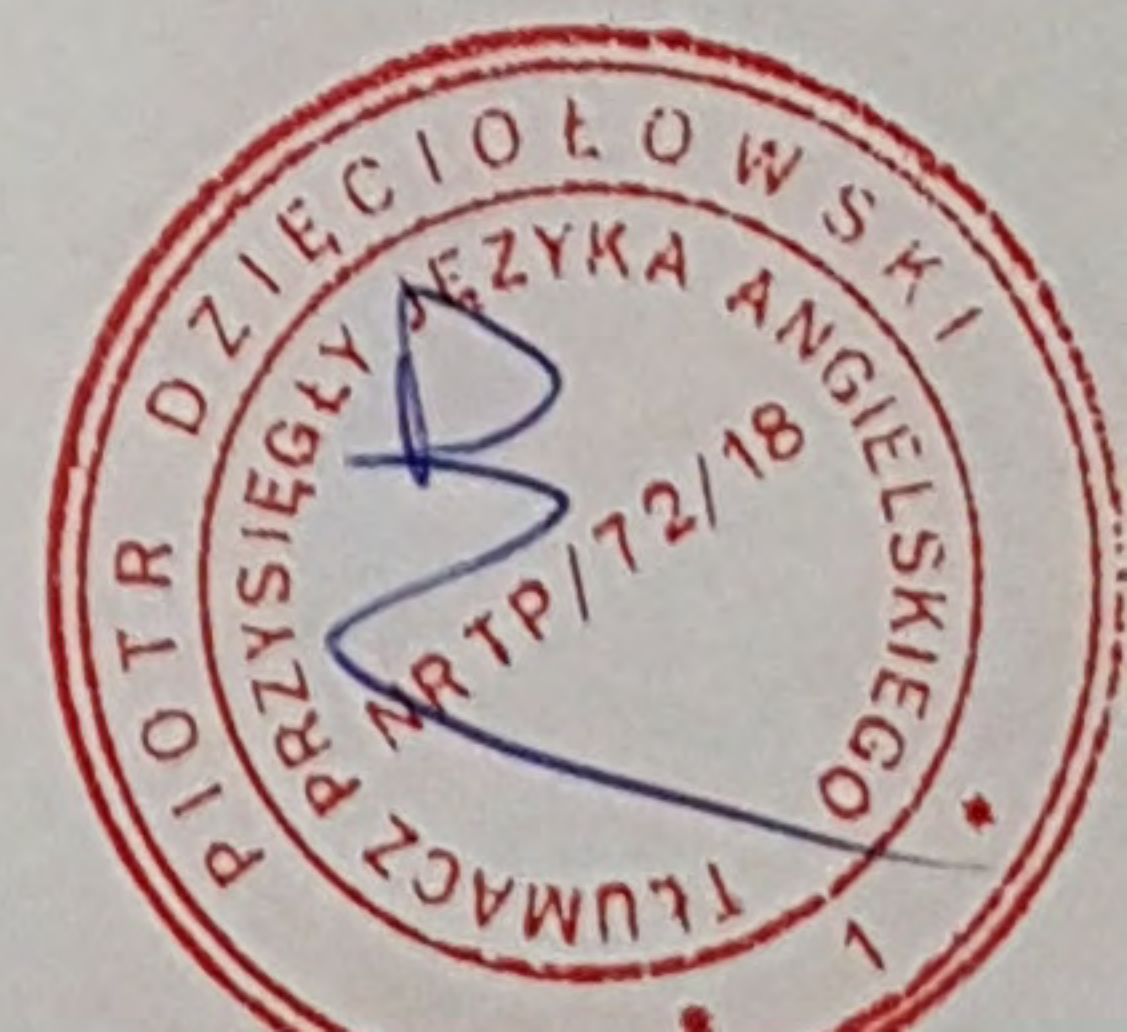
Appendix C. Characteristic load bearing capacity and breaking force values; p. 17---

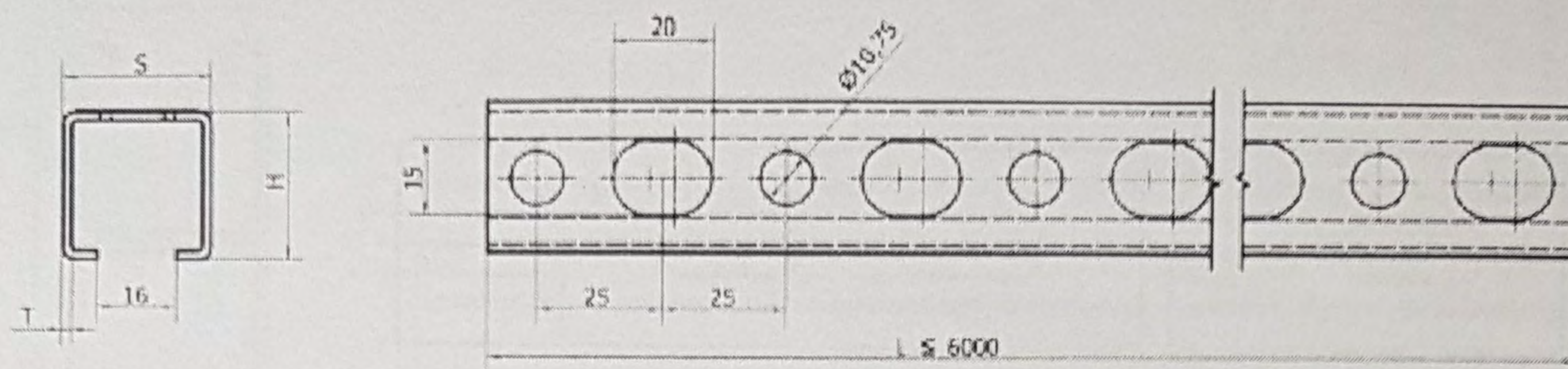
[Page 10]---

10/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

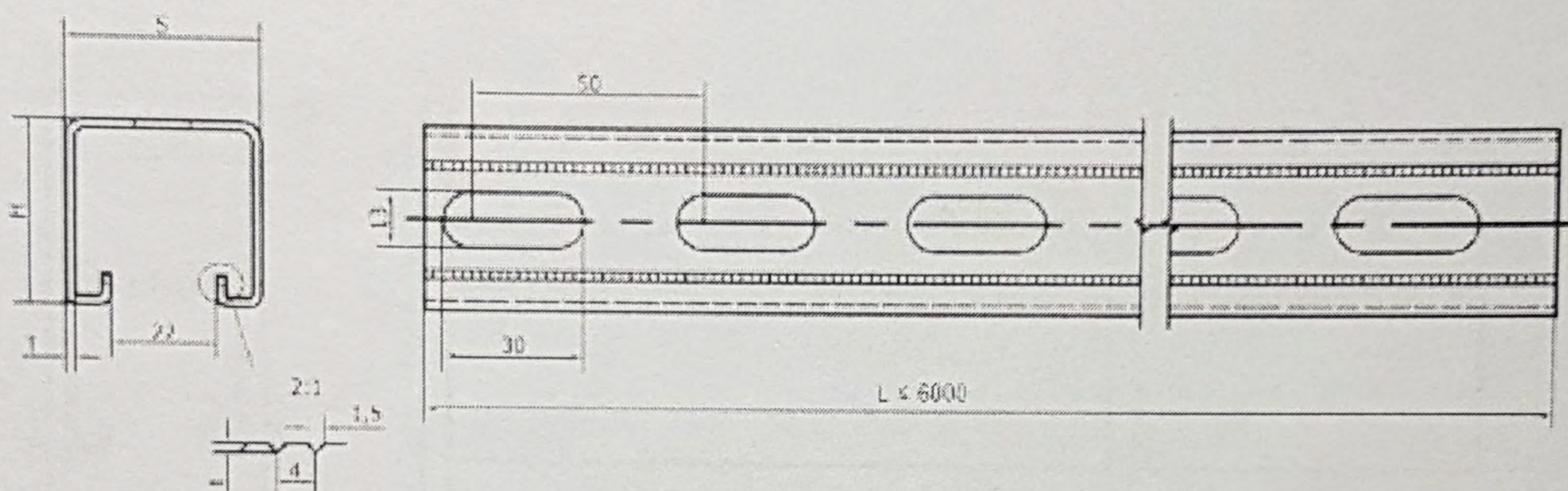
Appendix A.---





Product symbol	S, mm	H, mm	T, mm
1	2	3	4
LDB-30-20-150	30	20	≥ 1.50
LDB-30-20-175	30	20	≥ 1.75
LDB-30-30-150	30	30	≥ 1.50
LDB-30-30-175	30	30	≥ 1.75
LDB-30-45-150	30	45	≥ 1.50
LDB-30-45-175	30	45	≥ 1.75

Fig. A1. LDB mounting rails---



Product symbol	S, mm	H, mm	T, mm
1	2	3	4
LDBST-41-21-160	41	21	≥ 1.60
LDBST-41-21-200	41	21	≥ 2.00
LDBST-41-21-250	41	21	≥ 2.50
LDBST-41-41-200	41	41	≥ 2.00
LDBST-41-41-250	41	41	≥ 2.50

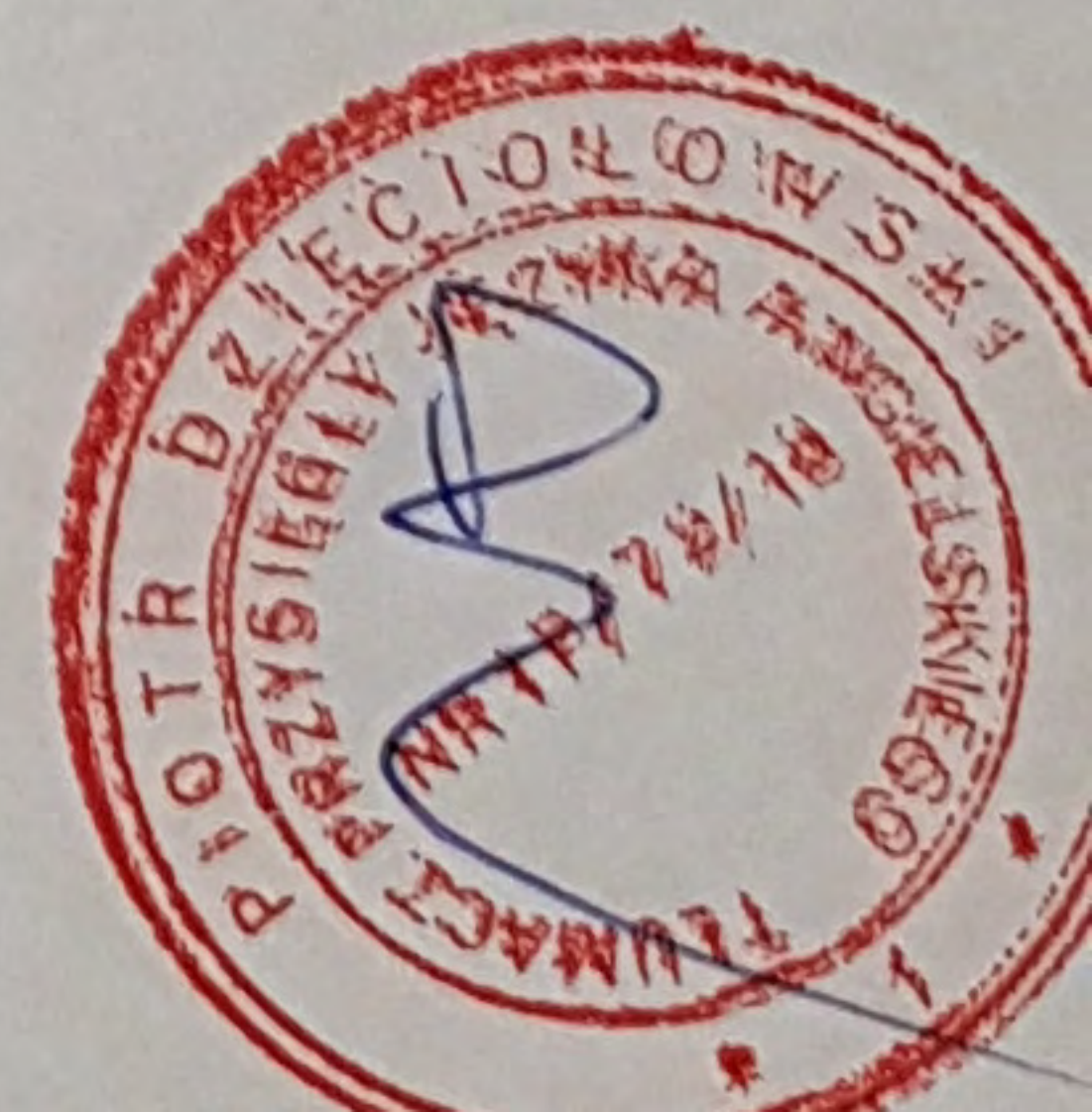
Fig. A2. LDBST mounting rails---

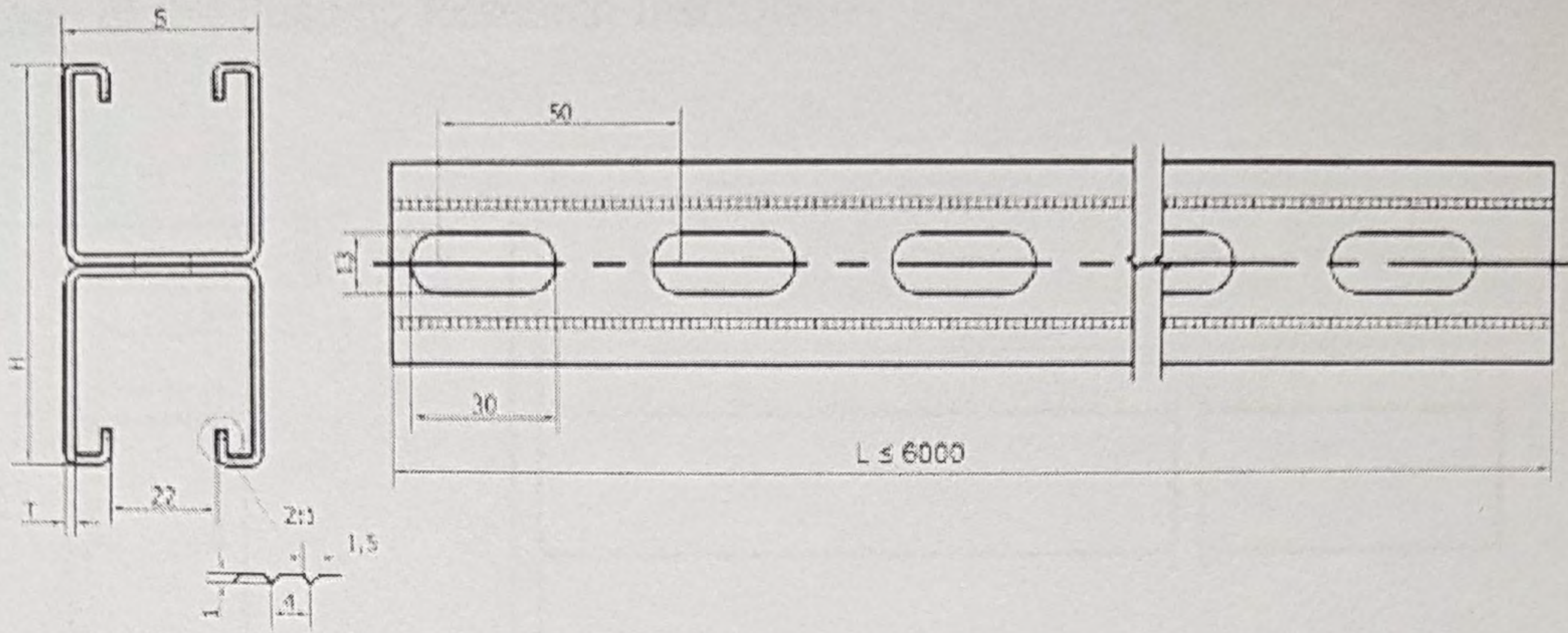
Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 11]---

[Logo of the Building Research Institute]---

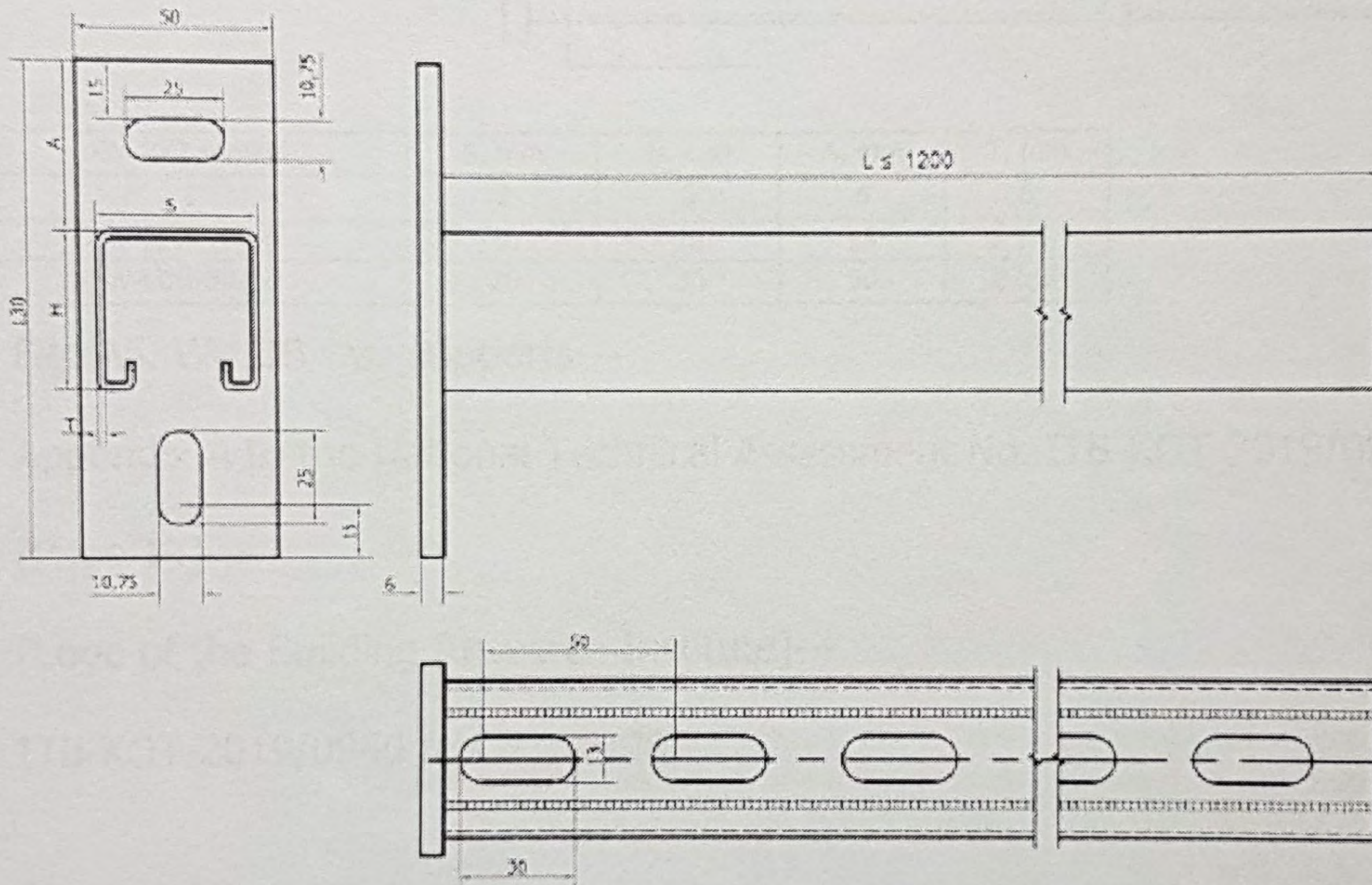
ITB-KOT-2019/0940 rev. 1; 11/26---





Product symbol	S, mm	H, mm	T, mm
1	2	3	4
LDBDT-41-41-41-200	41	82	≥2.00
LDBDT-41-41-41-250	41	82	≥2.50

Fig. A3. LDBDT mounting rails---



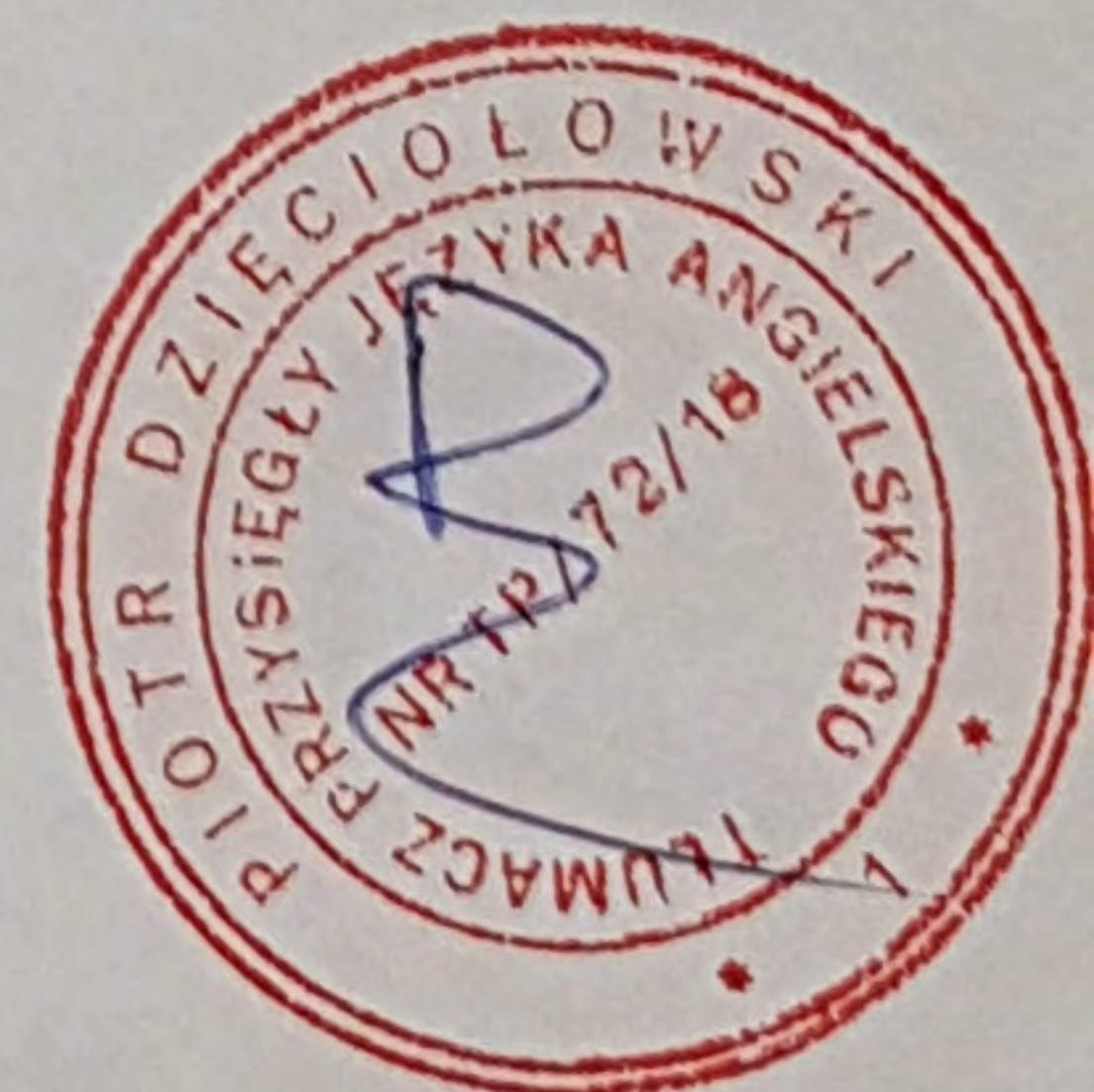
Product symbol	S, mm	H, mm	A, mm	T, mm
1	2	3	4	5
W-LDB-41-41	41	41	43	≥2.00

Fig. A4. W-LDB wall supports---

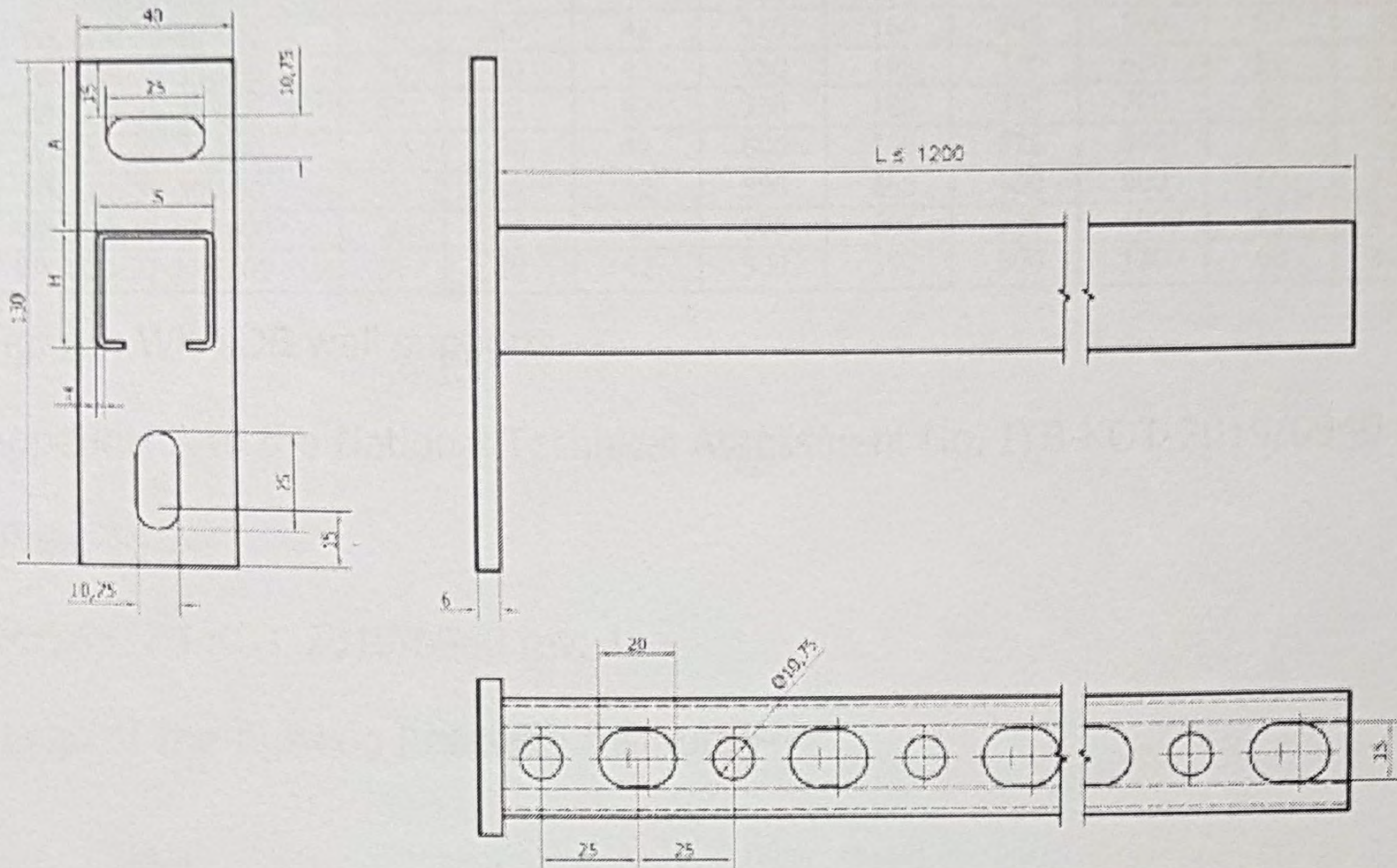
Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 12]---

12/26; ITB-KOT-2019/0940 rev. 1---



[Logo of the Building Research Institute]---



Product symbol	S, mm	H, mm	A, mm	T, mm
1	2	3	4	5
W-LDB-30-20	30	20	55	≥ 1.50
W-LDB-30-30	30	30	50	≥ 2.00

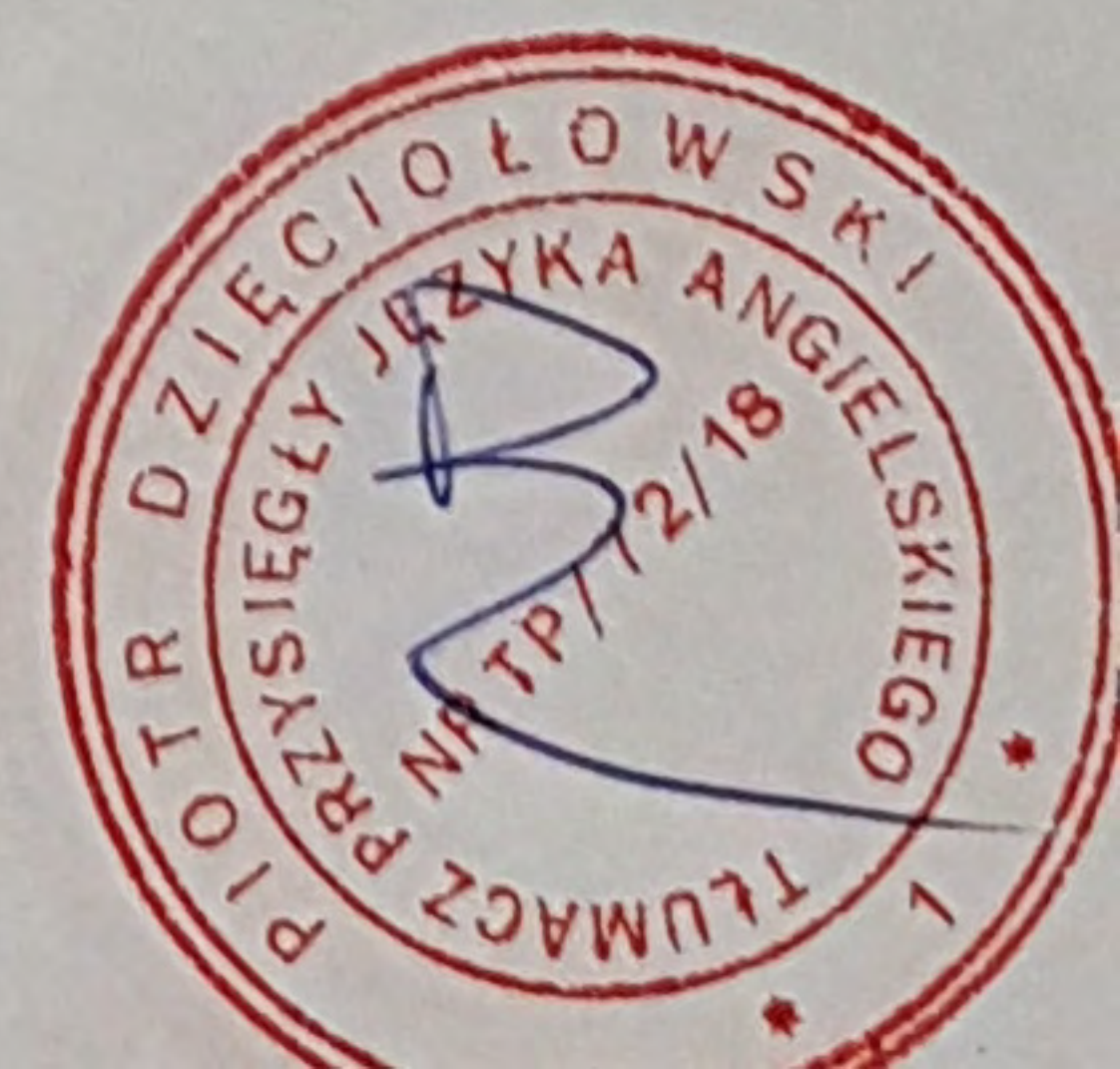
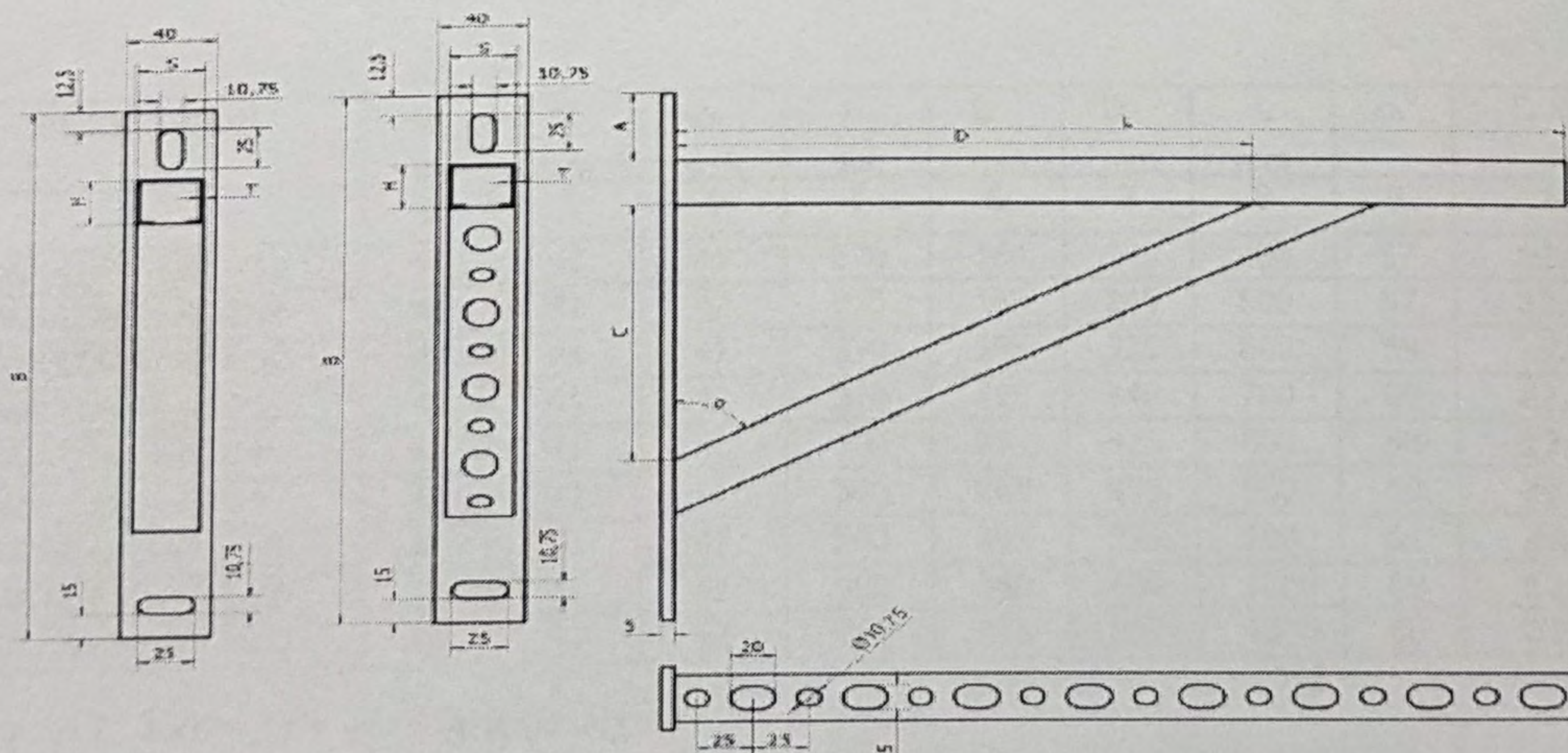
Fig. A5. W-LDB wall supports---

Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 13]---

[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 13/26---



Product symbol	S, mm	H, mm	A, mm	B, mm	C, mm	D, mm	L, mm	$\alpha, ^\circ$	T, mm
1	2	3	4	5	6	7	8	9	10
WK-LDB-30-30-400	30	30	42	350	160	245	400	57	≥ 2.00
WK-LDB-30-30-500	30	30	42	350	160	245	500	57	≥ 2.00
WK-LDB-30-30-600	30	30	42	350	195	320	600	59	≥ 2.00
WK-LDB-30-30-700	30	30	42	350	195	345	700	61	≥ 2.00
WK-LDB-30-30-800	30	30	42	500	265	425	800	58	≥ 2.00
WK-LDB-30-30-900	30	30	42	500	265	450	900	60	≥ 2.00
WK-LDB-30-30-1000	30	30	42	500	295	525	1000	61	≥ 2.00
WK-LDB-30-30-1200	30	30	42	500	350	600	1200	60	≥ 2.00

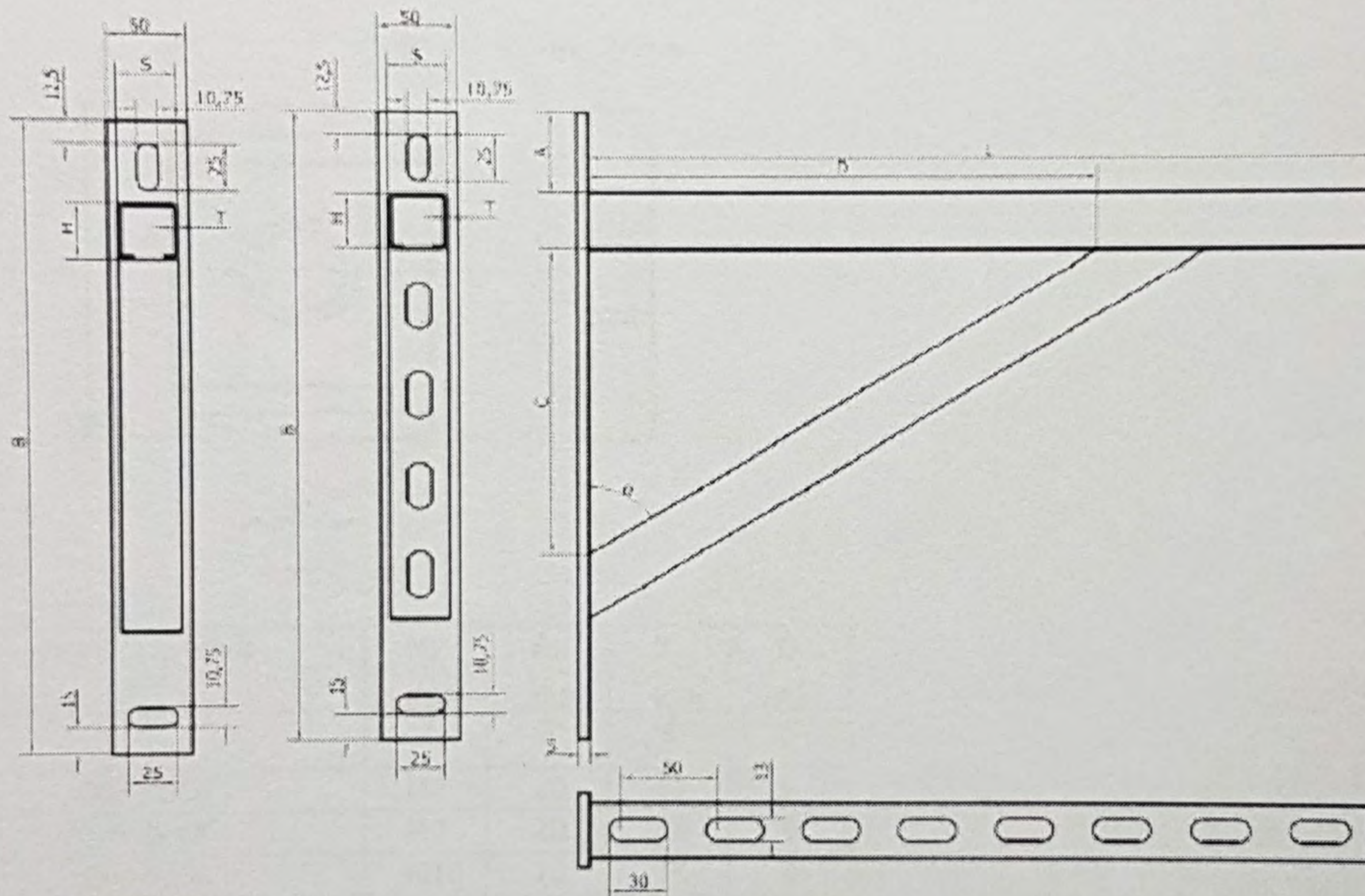
Fig. A6. WK-LDB wall supports---

Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 14]---

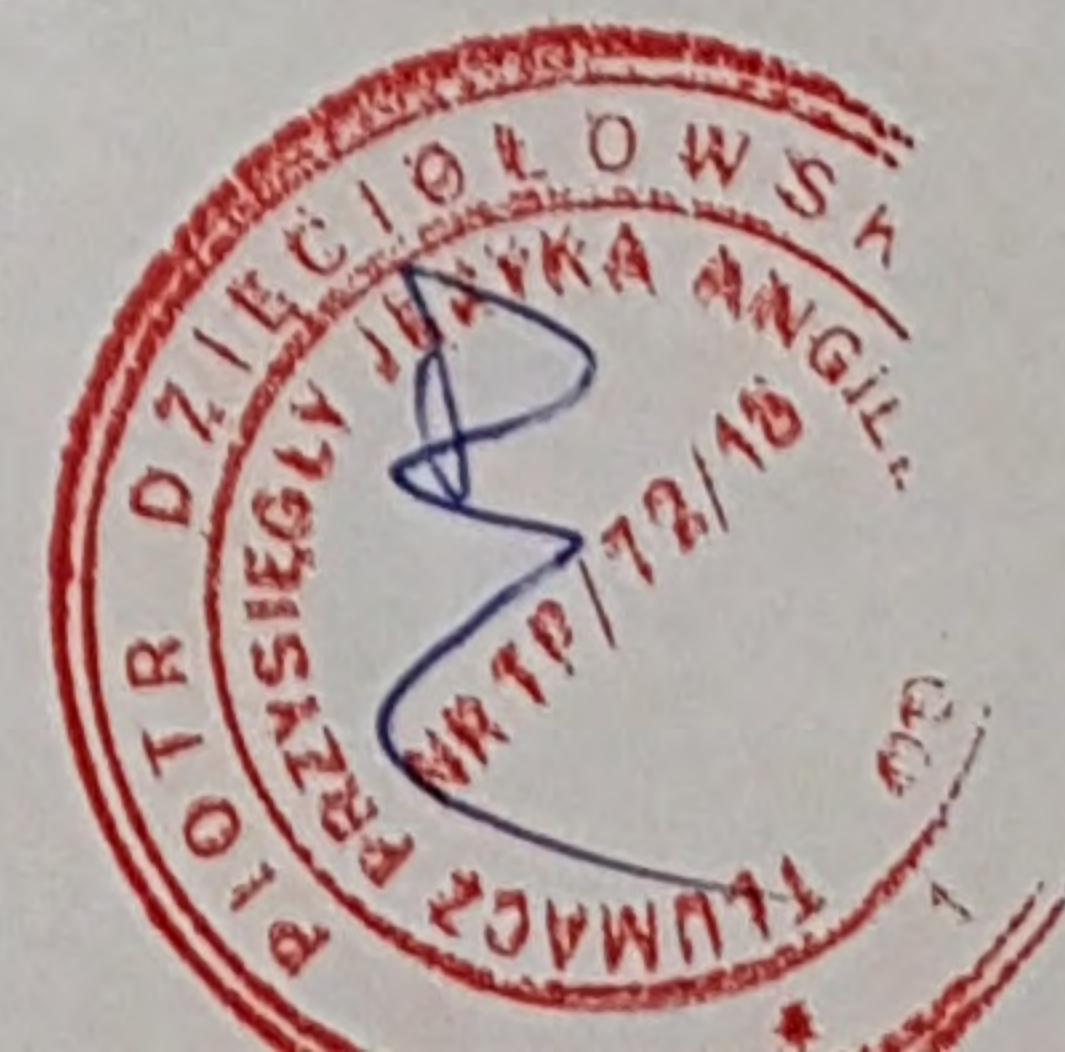
14/26; ITB-KOT-2019/0940 rev. 1---

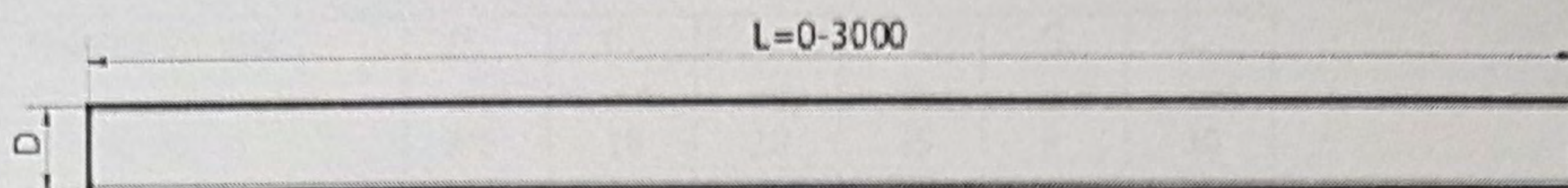
[Logo of the Building Research Institute]---



Product symbol	S, mm	H, mm	A, mm	B, mm	C, mm	D, mm	L, mm	$\alpha, ^\circ$	T, mm
1	2	3	4	5	6	7	8	9	10
WK-LDB-41-41-400	41	41	42	370	160	245	400	57	$\geq 2,00$
WK-LDB-41-41-500	41	41	42	370	160	245	500	57	$\geq 2,00$
WK-LDB-41-41-600	41	41	42	370	195	325	600	59	$\geq 2,00$
WK-LDB-41-41-700	41	41	42	370	195	340	700	60	$\geq 2,00$
WK-LDB-41-41-800	41	41	42	500	265	425	800	58	$\geq 2,00$
WK-LDB-41-41-900	41	41	42	500	265	450	900	60	$\geq 2,00$
WK-LDB-41-41-1000	41	41	42	500	295	525	1000	61	$\geq 2,00$
WK-LDB-41-41-1200	41	41	42	500	350	600	1200	60	$\geq 2,00$
WK-LDB-41-41-1500	41	41	42	750	475	825	1500	60	$\geq 2,00$

Fig. A7. WK-LDB wall supports---





Product symbol	D, mm
1	2
PG6	M6
PG8	M8
PG10	M10
PG12	M12

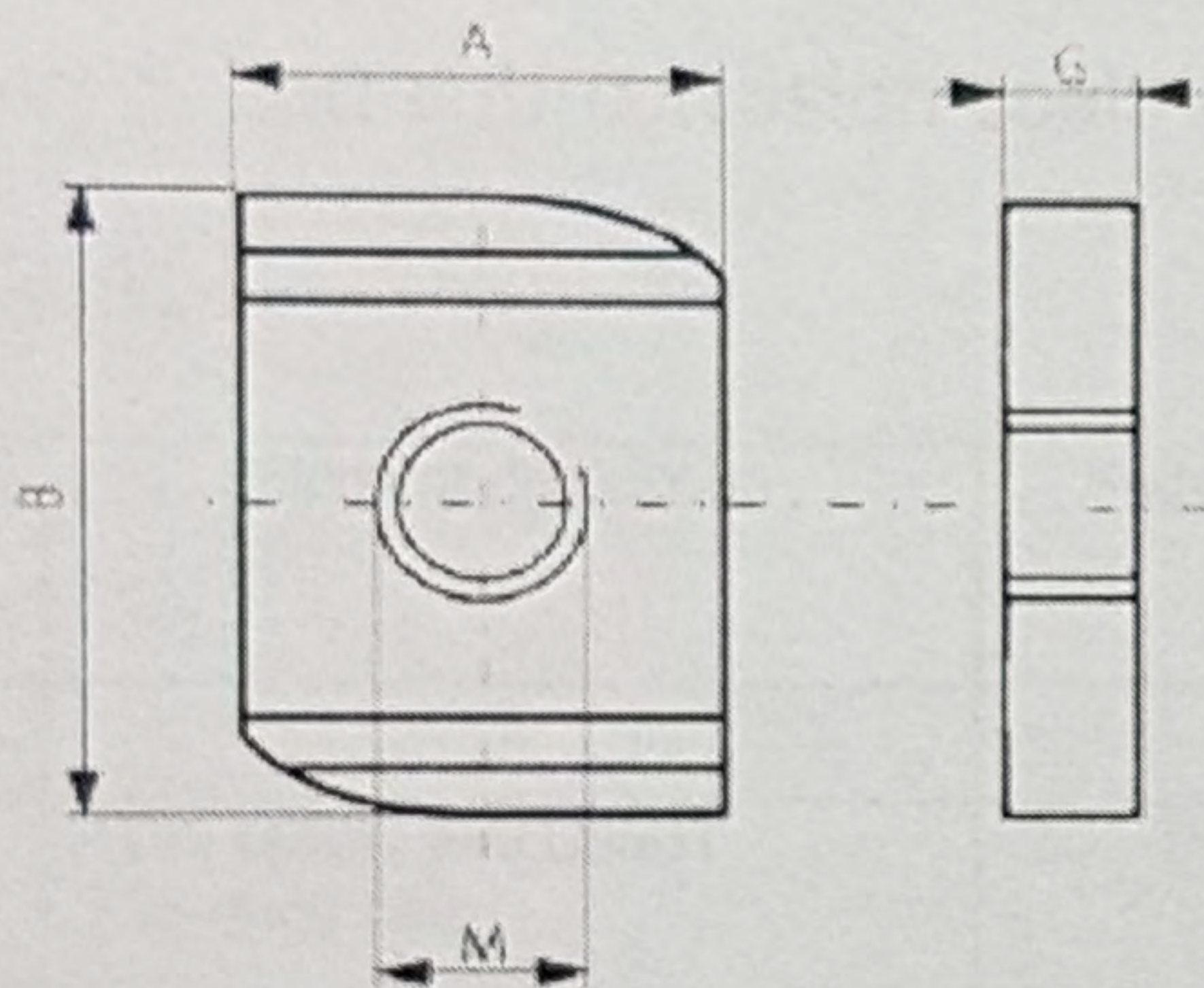
Fig. A8. PG threaded rods---

Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 15]---

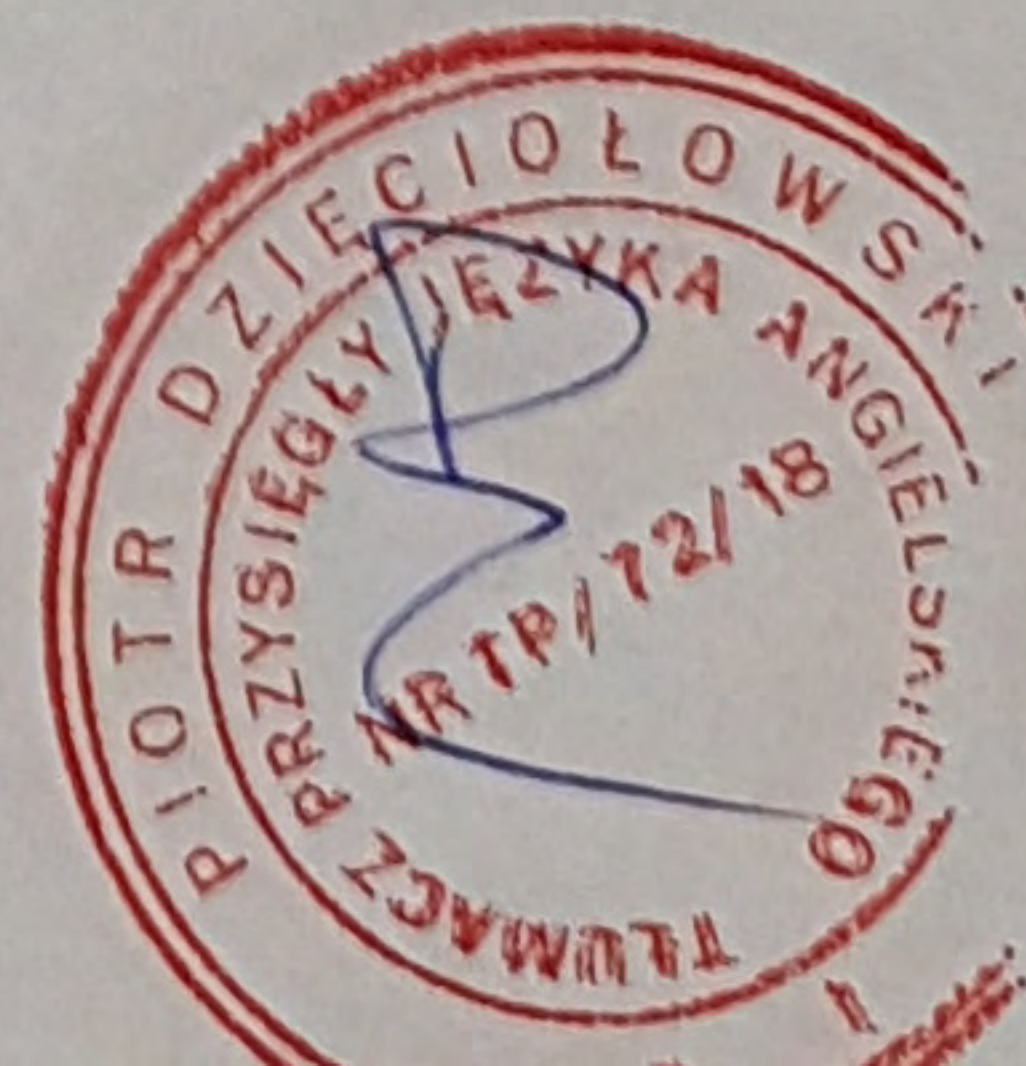
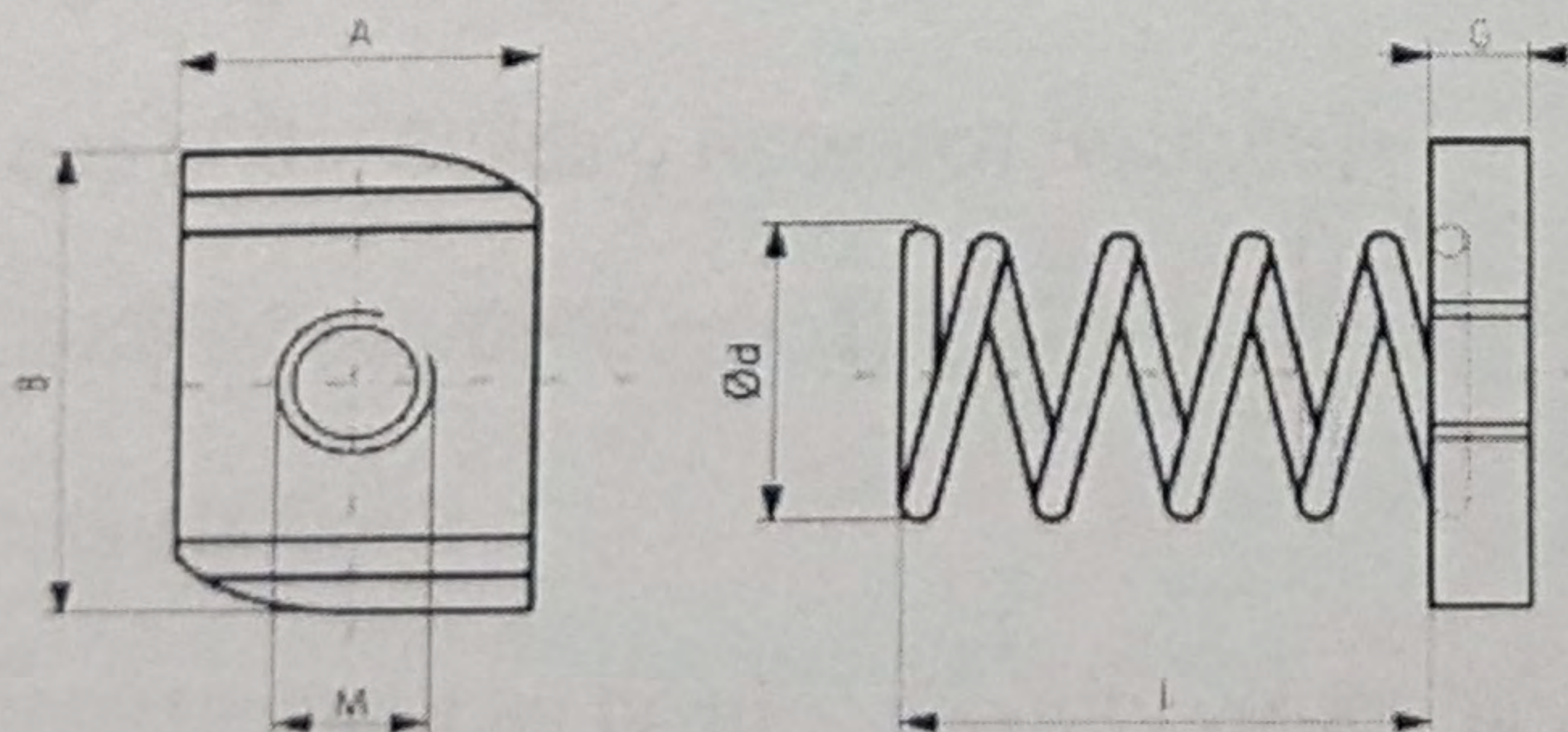
[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 15/26---



Product symbol	M, mm	A, mm	B, mm	G, mm
1	2	3	4	5
SNP-0606	M6	20	35	6
SNP-0806	M8	20	35	6
SNP-1008	M10	20	35	8
SNP-1212	M12	20	35	12

Fig. A9. SNP slide nuts, w/o a spring---



Product symbol	M, mm	d, mm	A, mm	B, mm	G, mm	L, mm
SNL-0606	M6	18	20	35	6	30
SNL-0806	M8	18	20	35	6	30
SNL-1008	M10	18	20	35	8	30
SNL-1212	M12	18	20	35	12	30
SNKL-0606	M6	18	20	35	6	15
SNKL-0806	M8	18	20	35	6	15
SNKL-1008	M10	18	20	35	8	15
SNKL-1210	M12	18	20	35	12	15

Fig. A10. SNL and SNKL slide nuts, with a spring---

Appendix A to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 16]---

16/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

Appendix B---

Materials and anti-corrosion coatings---

Table B1---

Item No.	Element description	Material description	Standard	Anti-corrosion coating
1	2	3	4	5
1	LDB, LDBST and LDBDT mounting rails	DX51D +Z100	PN-EN 10346:2015	Hot-dip galvanizing coating with a nominal thickness of 7 µm
2	W-LDB and WK-LDB wall supports	S235JR	PN-EN 10025-2:2007	Electro galvanizing coating with a thickness of at least 5 µm
3	SNP, SNL and SNKL slide nuts	S235JR	PN-EN 10025-2:2007	Electro galvanizing coating with a thickness of at least 5 µm
		Spring: steel wire	PN-EN 10270-1+A1:2017	
4	PG threaded rod	Common steel, carbon steel with mechanical properties class of at least 4.6	PN-EN 898-1:2013	Electro galvanizing coating with a thickness of at least 5 µm

Appendix B to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 17]---

[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 17/26---

Appendix C---

Characteristic load bearing capacity values for LDB mounting rails.---

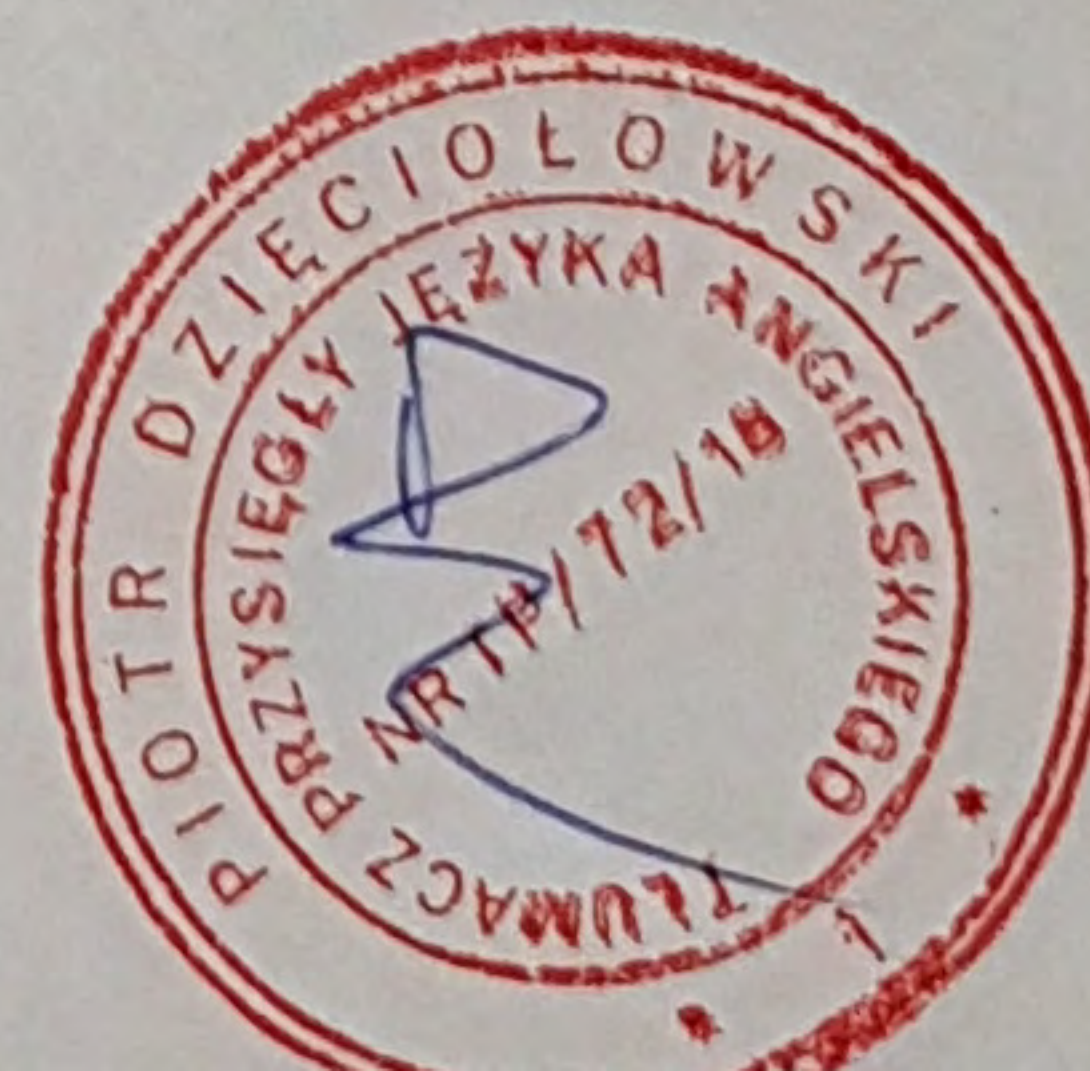
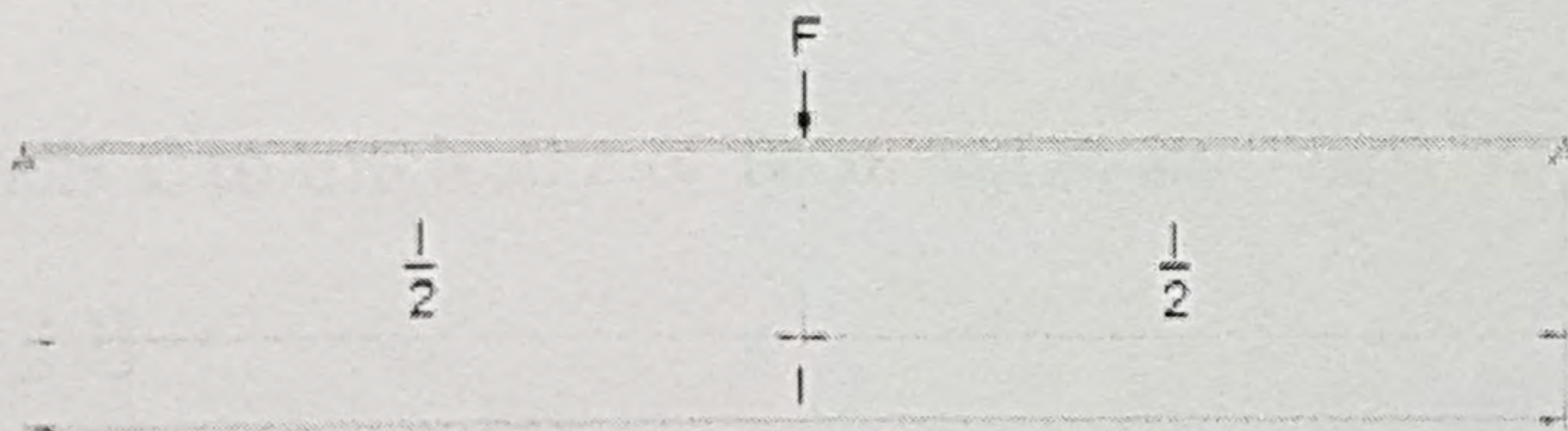


Table C1---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N					
		LDB	LDB	LDB	LDB	LDB	LDB
		30-20-150	30-20-175	30-30-150	30-30-175	30-45-150	30-45-175
1							
1.	250	1610	1827	3003	3406	5666	6502
2.	300	1342	1522	2503	2838	4721	5418
3.	350	1150	1305	2145	2433	4047	4644
4.	400	1006	1142	1877	2129	3541	4064
5.	450	843	1015	1668	1892	3148	3612
6.	500	683	839	1502	1703	2833	3251
7.	600	474	582	1251	1419	2361	2709
8.	700	348	428	1031	1180	2023	2322
9.	800	266	328	789	904	1771	2032
10.	900	211	259	623	714	1574	1806
11.	1000	170	209	505	579	1407	1497
12.	1200	118	146	350	402	977	1040
13.	1400	87	107	257	295	718	764
14.	1600	67	82	197	226	549	584
15.	1800	52	64	155	178	434	462
16.	2000	43	52	126	144	352	374
17.	2250	-	41	99	114	278	295
18.	2500	-	-	81	92	225	239
19.	2750	-	-	66	76	186	198
20.	3000	-	-	56	64	156	166
21.	3250	-	-	-	55	133	142
22.	3500	-	-	-	-	114	122
23.	3750	-	-	-	-	99	106
24.	4000	-	-	-	-	88	93
25.	4250	-	-	-	-	77	83
26.	4500	-	-	-	-	69	74
27.	4750	-	-	-	-	62	66
28.	5000	-	-	-	-	56	59
29.	5250	-	-	-	-	-	54
30.	5500	-	-	-	-	-	49

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 18]---

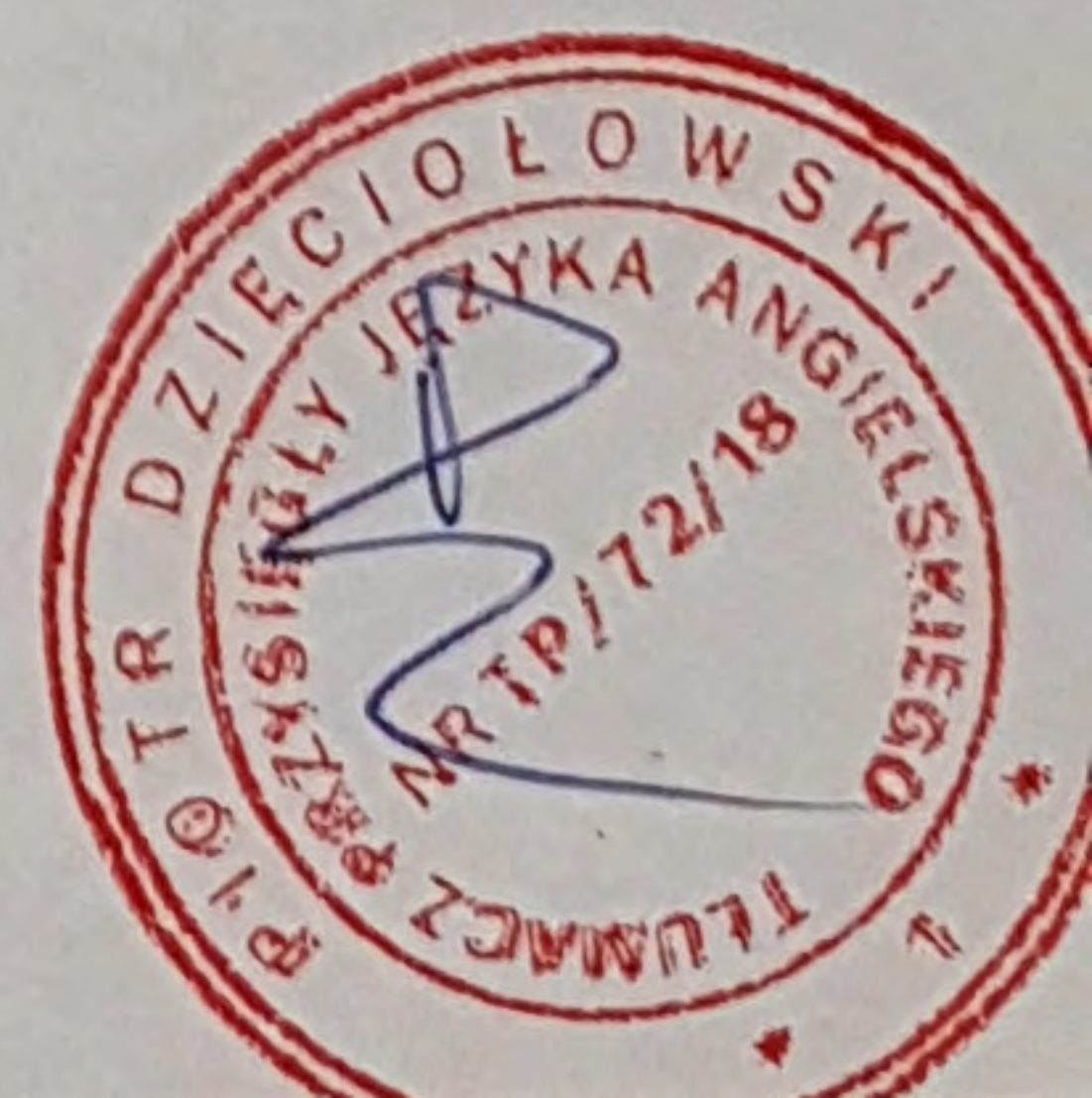
18/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute---

Characteristic load bearing capacity values for LDB mounting rails.---

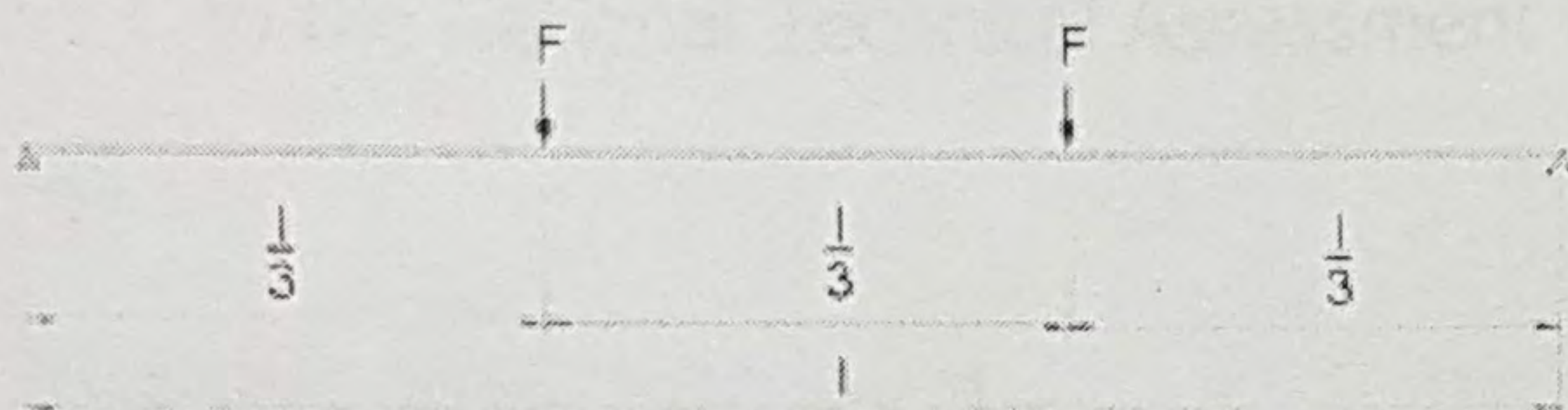
Table C2---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N					
		LDB	LDB	LDB	LDB	LDB	LDB
		30-20-150	30-20-175	30-30-150	30-30-175	30-45-150	30-45-175
1	2	3	4	5	6	7	8
1.	250	1207	1370	2252	2554	4249	4876



2.	300	1006	1142	1877	2129	3541	4064
3.	350	824	979	1609	1824	3035	3483
4.	400	631	775	1408	1596	2656	3048
5.	450	498	612	1251	1419	2361	2709
6.	500	404	496	1126	1277	2125	2438
7.	600	280	344	829	950	1771	2032
8.	700	206	253	609	698	1518	1742
9.	800	158	194	466	534	1299	1383
10.	900	125	153	369	422	1027	1093
11.	1000	101	124	299	342	832	885
12.	1200	70	86	207	237	577	615
13.	1400	52	63	152	175	424	452
14.	1600	-	48	117	134	325	346
15.	1800	-	-	92	106	257	273
16.	2000	-	-	75	85	208	221
17.	2250	-	-	59	68	164	175
18.	2500	-	-	48	55	133	142
19.	2750	-	-	-	-	110	117
20.	3000	-	-	-	-	92	98
21.	3250	-	-	-	-	79	84
22.	3500	-	-	-	-	68	72
23.	3750	-	-	-	-	58	62
24.	4000	-	-	-	-	52	55
25.	4250	-	-	-	-	46	49
26.	4500	-	-	-	-	-	44

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 19]---

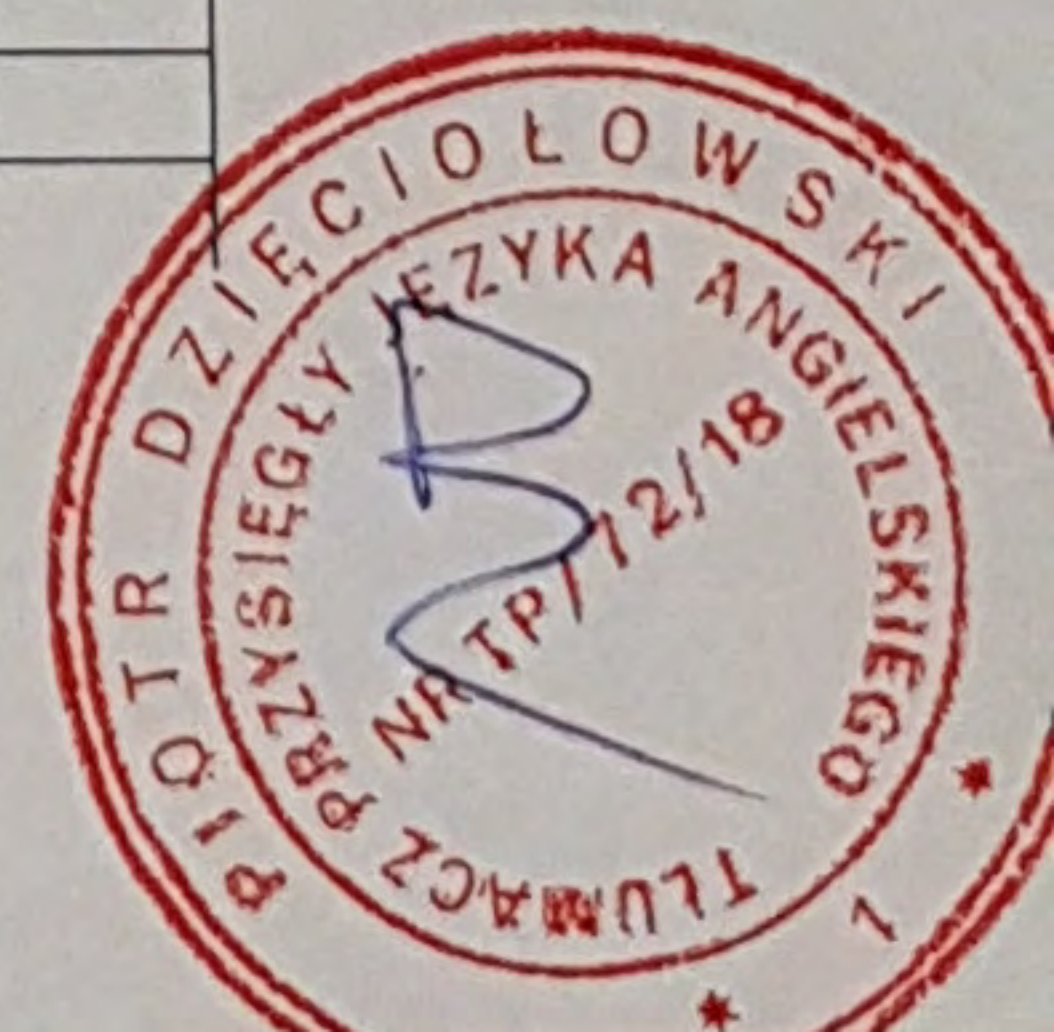
[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 19/26---

Characteristic load bearing capacity values for LDB mounting rails.---

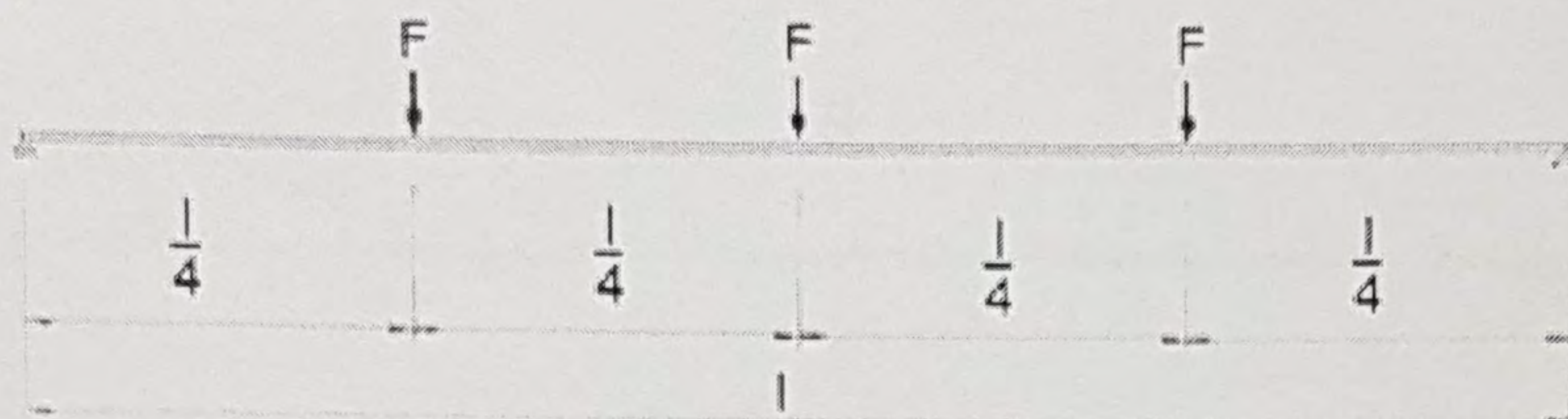
Table C3---

Item No.	Support spacing (I), mm	Characteristic load bearing capacity for deflection of l/200, N					
		LDB 30-20-150	LDB 30-20-175	LDB 30-30-150	LDB 30-30-175	LDB 30-45-150	LDB 30-45-175
1	2	3	4	5	6	7	8
1.	250	805	913	1502	1703	2833	3251
2.	300	671	761	1251	1419	2361	2709
3.	350	526	652	1073	1216	2023	2322
4.	400	402	552	938	1064	1771	2032
5.	450	318	436	834	946	1574	1806
6.	500	258	353	751	851	1416	1625
7.	600	179	245	591	677	1180	1355
8.	700	131	180	434	497	1012	1161



9.	800	101	138	332	381	885	985
10.	900	80	109	263	301	731	778
11.	1000	64	88	213	244	592	631
12.	1200	45	61	148	169	411	438
13.	1400	-	45	109	124	302	322
14.	1600	-	-	83	95	231	246
15.	1800	-	-	66	75	183	195
16.	2000	-	-	53	61	148	158
17.	2250	-	-	-	48	117	125
18.	2500	-	-	-	-	95	101
19.	2750	-	-	-	-	78	83
20.	3000	-	-	-	-	66	70
21.	3250	-	-	-	-	56	60
22.	3500	-	-	-	-	48	51
23.	3750	-	-	-	-	-	45

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 20]---

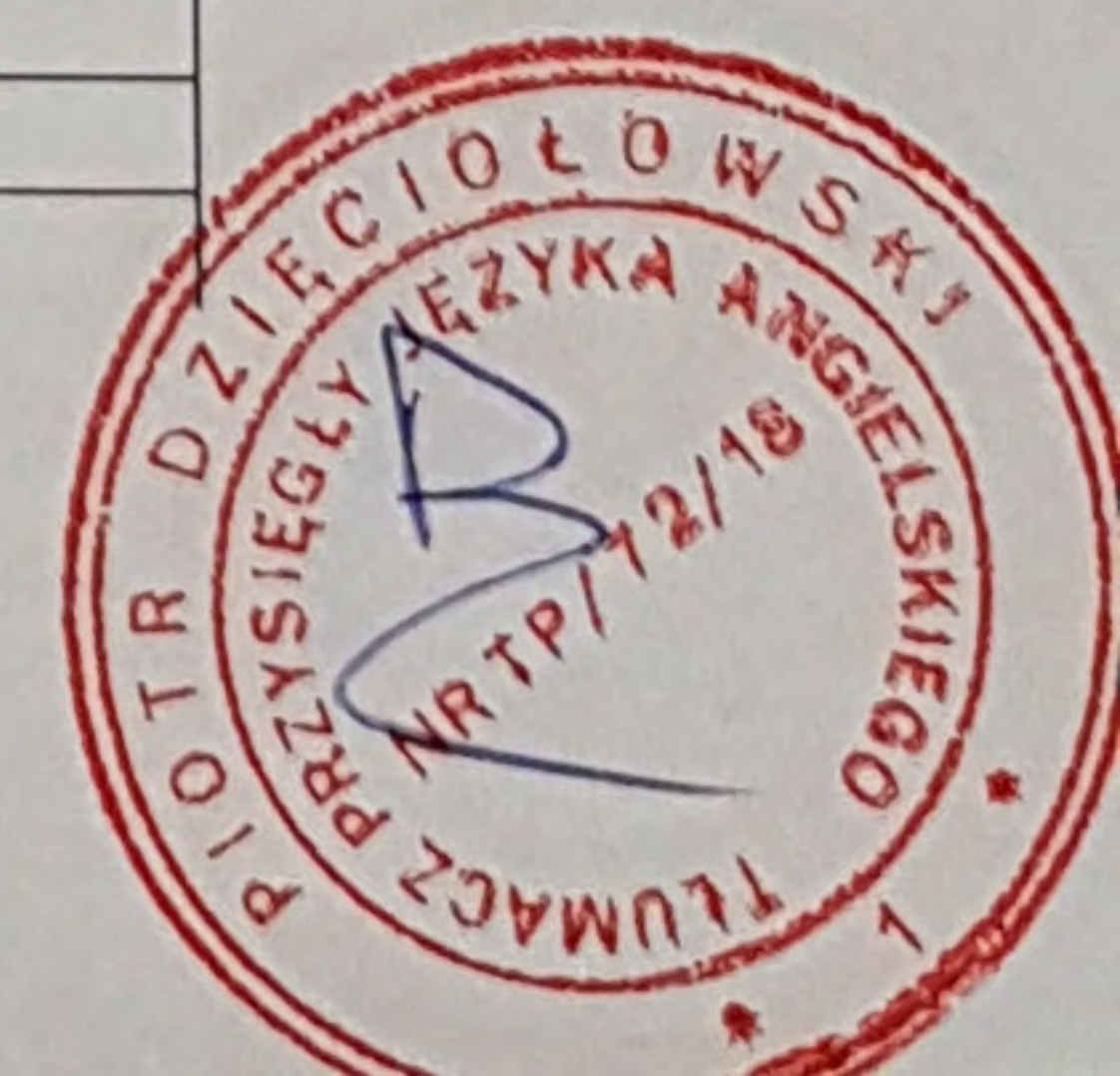
20/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

Characteristic load bearing capacity values for LDB mounting rails.---

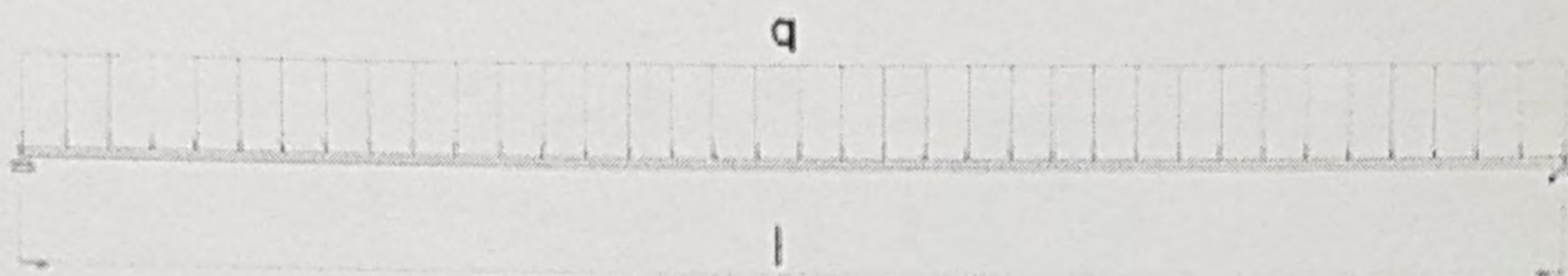
Table C4---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N					
		LDB 30-20-150	LDB 30-20-175	LDB 30-30-150	LDB 30-30-175	LDB 30-45-150	LDB 30-45-175
1	2	3	4	5	6	7	8
1.	250	3220	3653	6006	6811	11331	13003
2.	300	2683	3044	5005	5676	9443	10836
3.	350	2230	2609	4290	4865	8094	9288
4.	400	1708	2097	3754	4257	7082	8127
5.	450	1349	1657	3337	3784	6295	7224
6.	500	1093	1342	3003	3406	5666	6502
7.	600	759	932	2245	2572	4721	5418
8.	700	558	685	1649	1889	4047	4644
9.	800	427	524	1263	1446	3517	3743
10.	900	337	414	998	1143	2779	2958
11.	1000	273	336	808	926	2251	2396
12.	1200	190	233	561	643	1563	1664
13.	1400	139	171	412	472	1149	1222
14.	1600	107	131	316	362	879	936
15.	1800	84	104	249	286	695	739
16.	2000	68	84	202	231	563	599



17.	2250	54	66	160	183	445	473
18.	2500	-	54	129	148	360	383
19.	2750	-	-	107	122	298	317
20.	3000	-	-	90	103	250	266
21.	3250	-	-	77	88	213	227
22.	3500	-	-	66	76	184	196
23.	3750	-	-	57	66	160	170
24.	4000	-	-	51	58	141	150
25.	4250	-	-	-	-	125	133
26.	4500	-	-	-	-	111	118
27.	4750	-	-	-	-	100	106
28.	5000	-	-	-	-	90	96
29.	5250	-	-	-	-	82	87
30.	5500	-	-	-	-	74	79
31.	5750	-	-	-	-	68	72
32.	6000	-	-	-	-	63	67

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 21]---

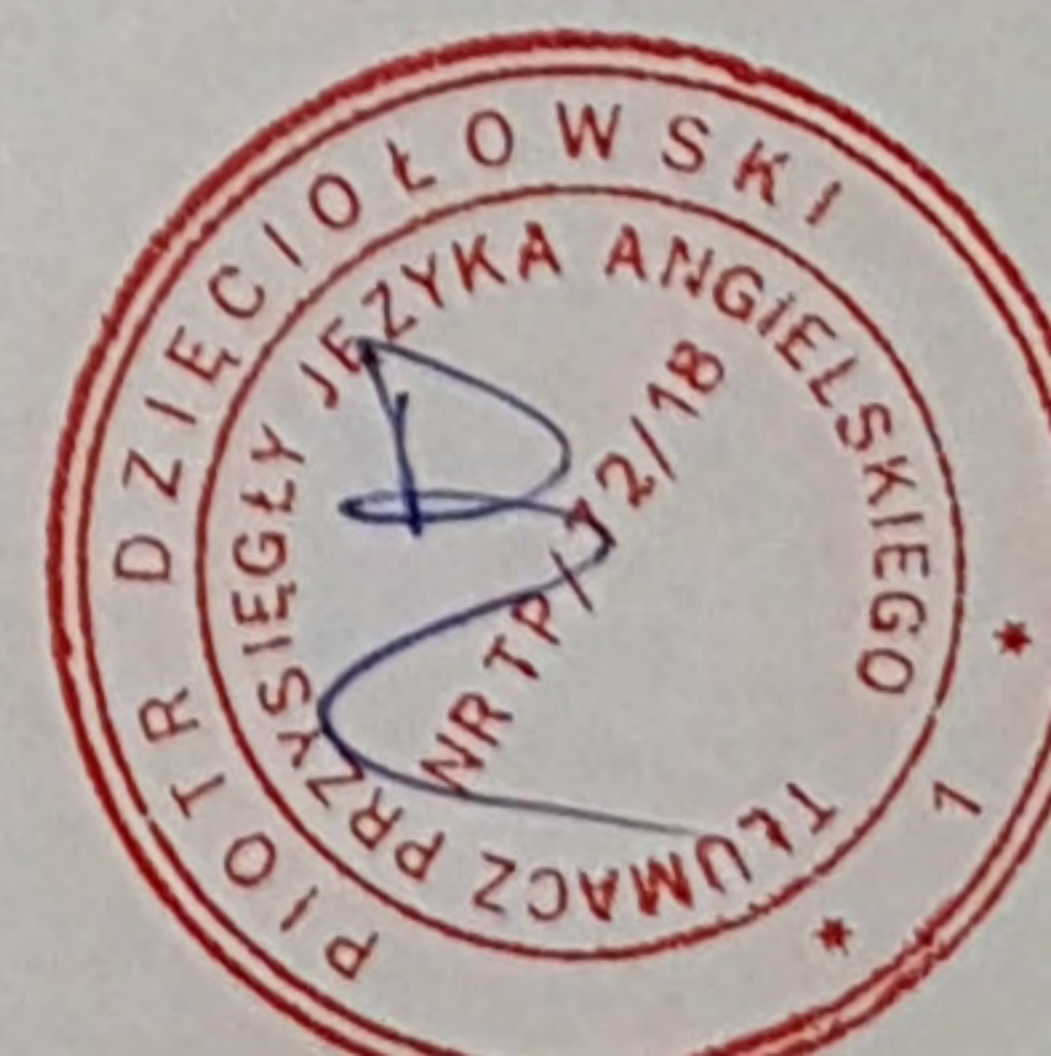
[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 21/26---

Characteristic load bearing capacity values for LDBST mounting rails.---

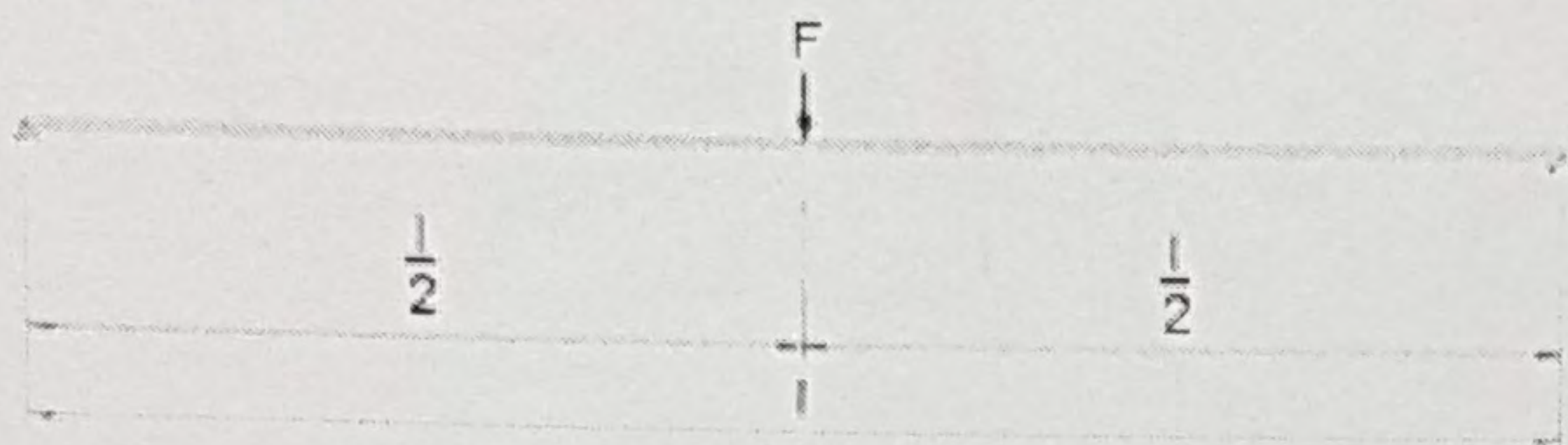
Table C5---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N				
		LDBST	LDBST	LDBST	LDBST	LDBST
		41-21-160	41-21-200	41-21-250	41-41-200	41-41-250
1	2	3	4	5	6	7
1.	250	2050	3251	3746	12167	14613
2.	300	-	2709	3122	10139	12178
3.	350	-	2322	2676	8691	10438
4.	400	-	2032	2341	7605	9133
5.	450	-	1714	2081	6760	8118
6.	500	840	1388	1858	6084	7307
7.	600	-	964	1290	5070	6050
8.	700	-	708	948	3749	4445
9.	800	-	542	726	2870	3403
10.	900	-	428	573	2268	2689
11.	1000	160	347	464	1837	2178
12.	1200	-	241	322	1276	1513
13.	1400	-	177	237	937	1111
14.	1600	68	136	181	718	847
15.	1800	-	107	143	567	672
16.	2000	-	86	116	459	544



17.	2250	-	68	92	362	430
18.	2500	-	55	74	293	348
19.	2750	-	46	61	242	288
20.	3000	-	-	-	204	242
21.	3250	-	-	-	173	206
22.	3500	-	-	-	149	178
23.	3750	-	-	-	130	155
24.	4000	-	-	-	115	136
25.	4250	-	-	-	101	121
26.	4500	-	-	-	91	107
27.	4750	-	-	-	81	96
28.	5000	-	-	-	73	87
29.	5250	-	-	-	67	79
30.	5500	-	-	-	61	72
31.	5750	-	-	-	55	65
32.	6000	-	-	-	51	60

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 22]---

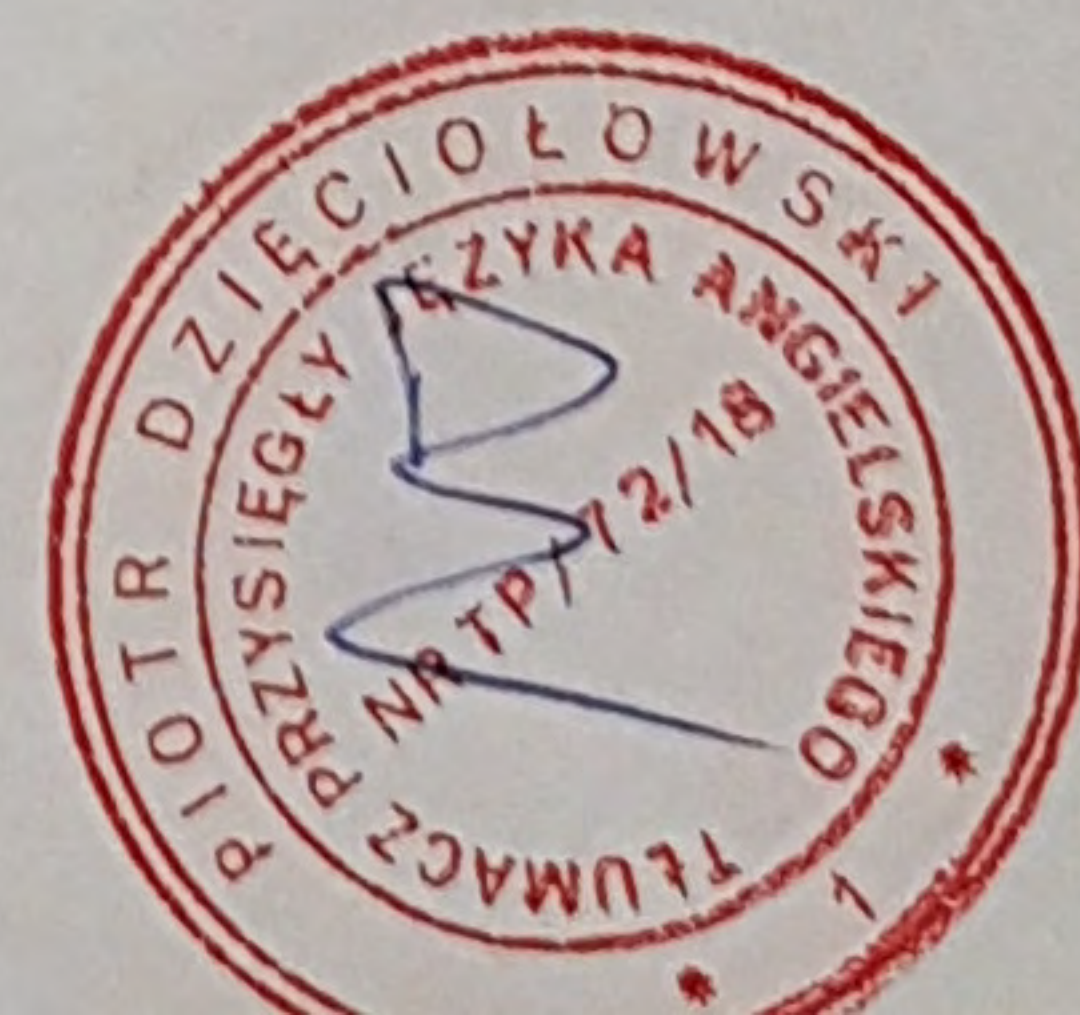
22/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

Characteristic load bearing capacity values for LDBST mounting rails.---

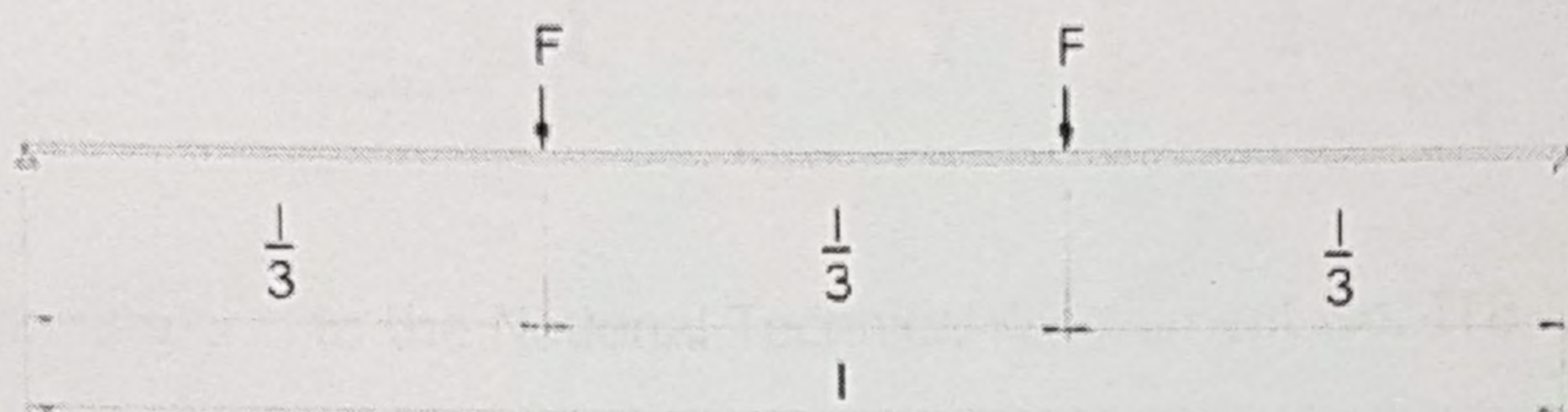
Table C6---

Item No.	Support spacing (I), mm	Characteristic load bearing capacity for deflection of l/200, N			
		LDBST 41-21-200	LDBST 41-21-250	LDBST 41-41-200	LDBST 41-41-250
1	2	3	4	5	6
1.	250	2438	2810	9125	10960
2.	300	2032	2341	7605	9133
3.	350	1675	2007	6518	7828
4.	400	1282	1716	5703	6850
5.	450	1013	1356	5070	6089
6.	500	821	1098	4342	5148
7.	600	570	763	3016	3575
8.	700	419	560	2216	2627
9.	800	321	429	1696	2011
10.	900	253	339	1341	1589
11.	1000	205	275	1086	1288
12.	1200	143	191	754	894
13.	1400	105	140	554	657
14.	1600	80	107	424	503
15.	1800	63	85	335	397



16.	2000	51	69	271	322
17.	2250	-	54	214	254
18.	2500	-	-	174	206
19.	2750	-	-	144	170
20.	3000	-	-	121	143
21.	3250	-	-	103	122
22.	3500	-	-	89	105
23.	3750	-	-	76	90
24.	4000	-	-	68	80
25.	4250	-	-	60	71
26.	4500	-	-	54	64
27.	4750	-	-	48	57
28.	5000	-	-	43	51

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 23]---

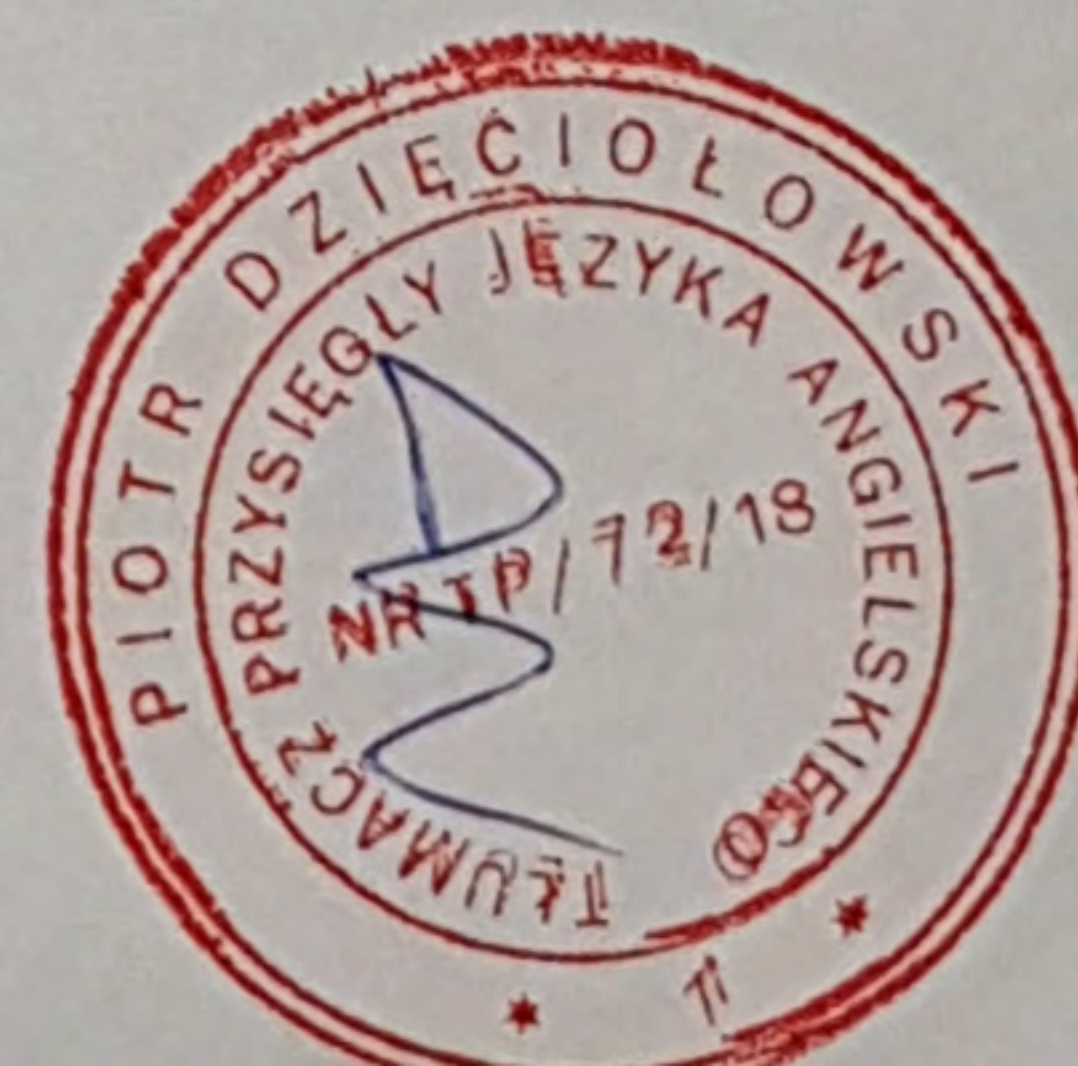
[Logo of the Building Research Institute]---

ITB-KOT-2019/0940 rev. 1; 23/26---

Characteristic load bearing capacity values for LDBST mounting rails.---

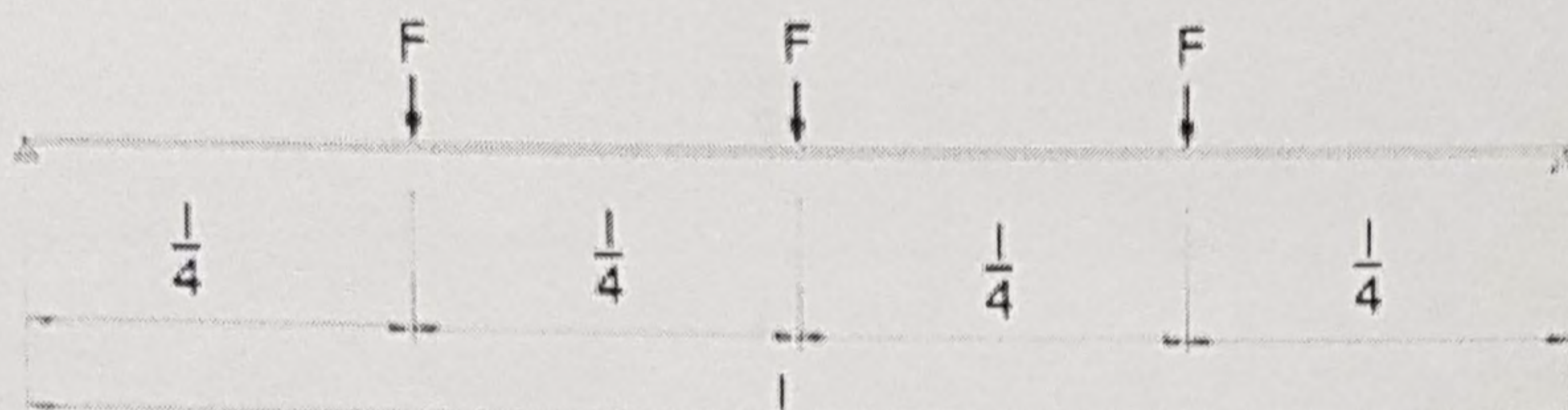
Table C7---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N			
		LDBST 41-21-200	LDBST 41-21-250	LDBST 41-41-200	LDBST 41-41-250
1	2	3	4	5	6
1.	250	1625	1873	6084	7307
2.	300	1355	1561	5070	6089
3.	350	1161	1338	4345	5219
4.	400	914	1171	3802	4567
5.	450	722	966	3380	4059
6.	500	585	782	3042	3653
7.	600	406	543	2149	2548
8.	700	298	399	1579	1872
9.	800	228	306	1209	1433
10.	900	181	242	955	1132
11.	1000	146	196	774	917
12.	1200	102	136	537	637
13.	1400	75	100	395	468
14.	1600	57	76	302	358
15.	1800	45	60	239	283
16.	2000	-	49	193	229
17.	2250	-	-	153	181



18.	2500	-	-	124	147
19.	2750	-	-	102	121
20.	3000	-	-	86	102
21.	3250	-	-	73	87
22.	3500	-	-	63	75
23.	3750	-	-	55	65
24.	4000	-	-	48	57
25.	4250	-	-	43	51
26.	4500	-	-	-	45

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 24]---

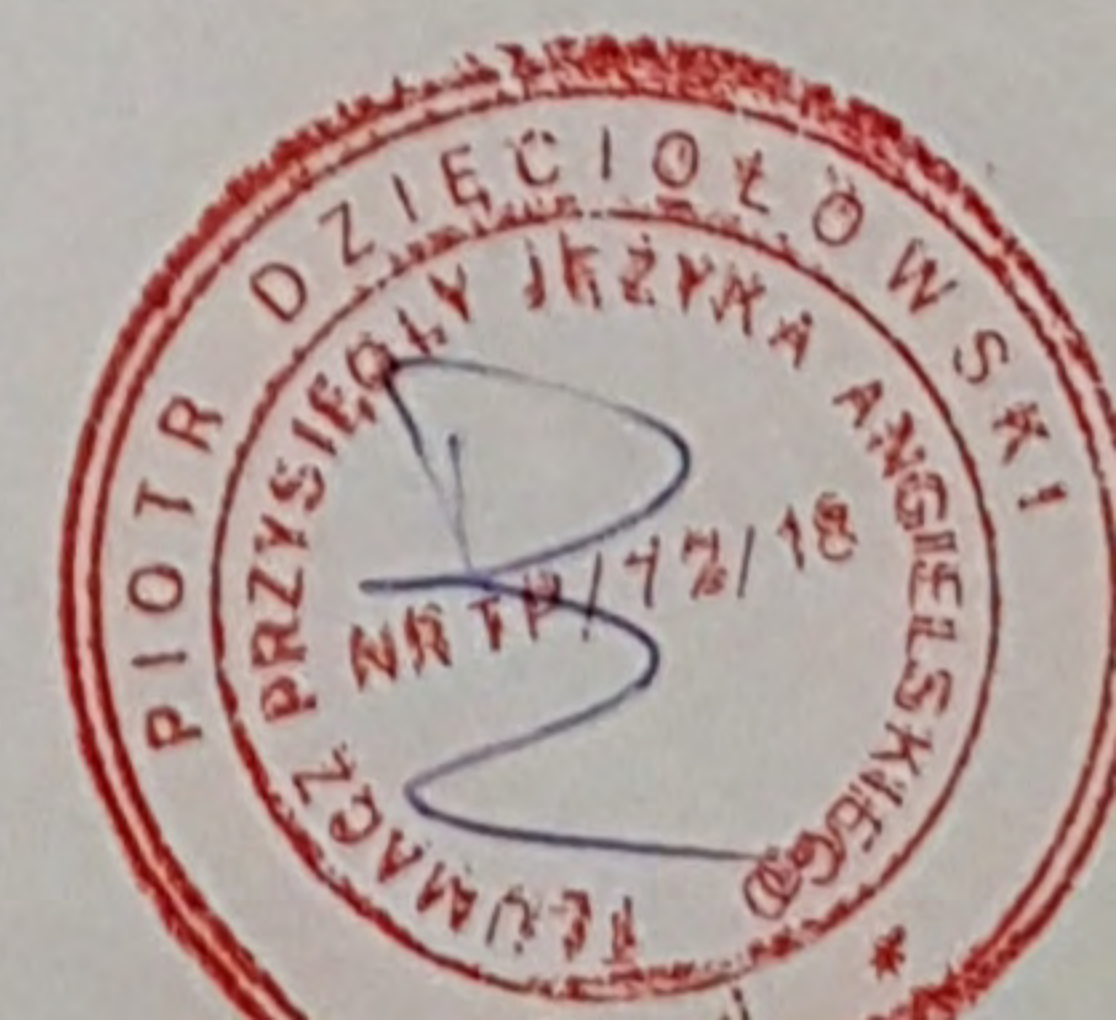
24/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Building Research Institute]---

Characteristic load bearing capacity values for LDBST mounting rails.---

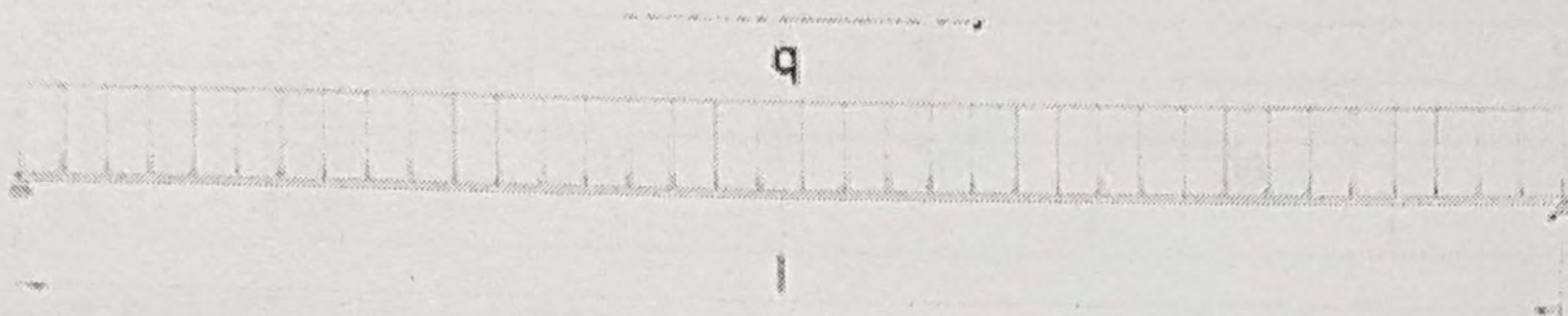
Table C8---

Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of l/200, N			
		LDBST 41-21-200	LDBST 41-21-2500	LDBST 41-41-200	LDBST 41-41-2500
1	2	3	4	5	6
1.	250	6502	7492	24335	29226
2.	300	5418	6244	20279	24355
3.	350	4534	5352	17382	20876
4.	400	3472	4646	15209	18266
5.	450	2743	3671	13519	16237
6.	500	2222	2973	11758	13941
7.	600	1543	2065	8166	9682
8.	700	1134	1517	5999	7113
9.	800	868	1161	4593	5446
10.	900	686	918	3629	4303
11.	1000	555	743	2940	3486
12.	1200	386	516	2041	2421
13.	1400	283	379	1500	1778
14.	1600	217	290	1148	1361
15.	1800	171	229	907	1076
16.	2000	139	186	735	871
17.	2250	110	147	581	688
18.	2500	89	119	470	558
19.	2750	73	98	389	461
20.	3000	62	83	327	387
21.	3250	53	70	278	330



22.	3500	45	61	240	285
23.	3750	-	-	209	248
24.	4000	-	-	184	218
25.	4250	-	-	163	193
26.	4500	-	-	145	172
27.	4750	-	-	130	154
28.	5000	-	-	118	139
29.	5250	-	-	107	126
30.	5500	-	-	97	115
31.	5750	-	-	89	105
32.	6000	-	-	82	97

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 25]---

[Logo of the Building Research Institute]---

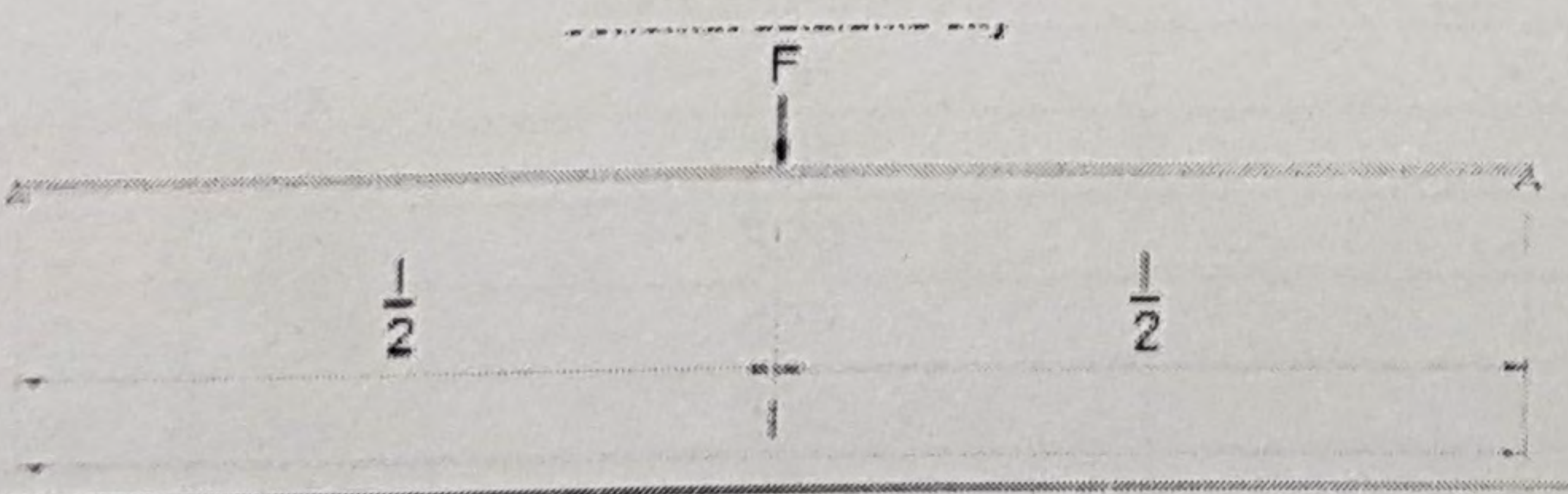
ITB-KOT-2019/0940 rev. 1; 25/26---

Characteristic load bearing capacity values for LDBDT mounting rails.---

Table C9---

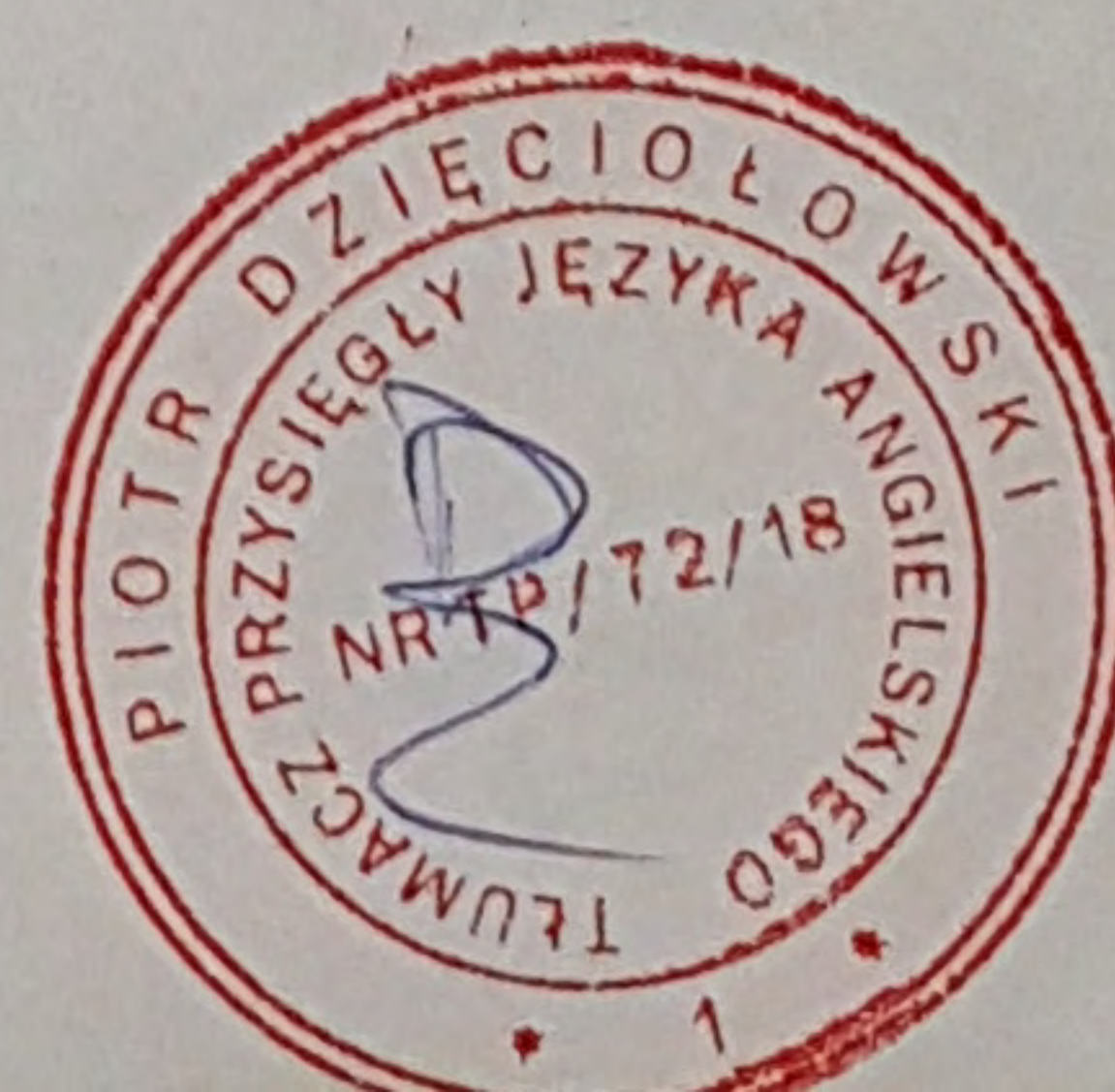
Item No.	Support spacing (l), mm	Characteristic load bearing capacity for deflection of $l/200, N$	
		LDBDT	LDBST
		41-41-41-200	41-41-41-250
1	2	3	4
1.	250	10860	14070
2.	500	8800	11250
3.	1000	4100	5725
4.	1600	1050	1490

Force action diagram---



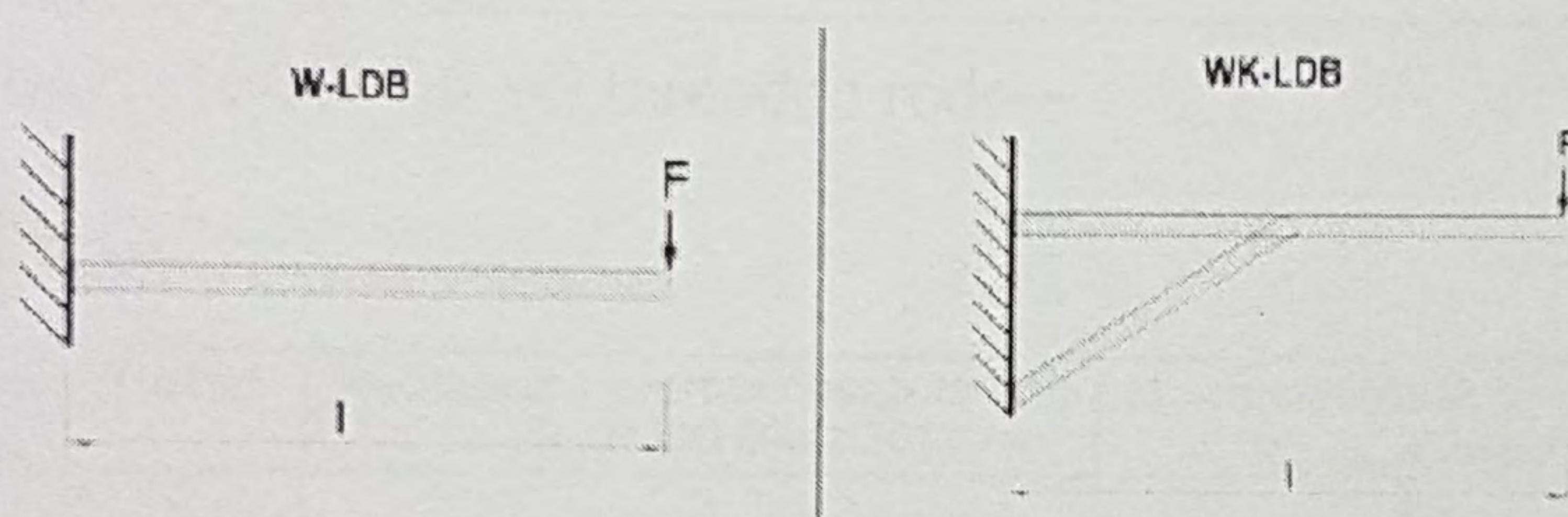
Characteristic load bearing capacity values for W-LDB and WK-LDB wall supports---

Table C10---



Item No.	l, mm	Characteristic load bearing capacity for deflection of l/100, N				
		W-LDB-30-20	W-LDB-30-30	W-LDB-41-41	WK-LDB-30-30	WK-LDB-41-41
1	2	3	4	5	6	7
1.	150	-	353	-	-	-
2.	200	-	264	-	-	-
3.	250	-	212	-	-	-
4.	300	-	176	-	-	-
5.	350	-	151	-	-	-
6.	400	-	132	-	1748	-
7.	450	70	118	320	-	-
8.	500	-	100	-	971	-
9.	550	-	83	-	-	-
10.	600	-	69	-	950	1130
11.	650	-	59	-	-	-
12.	700	-	51	-	594	-
13.	750	-	44	-	-	-
14.	1200	15	30	80	220	-
15.	1500	-	-	-	-	420

Force action diagram---



Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

[Page 26]---

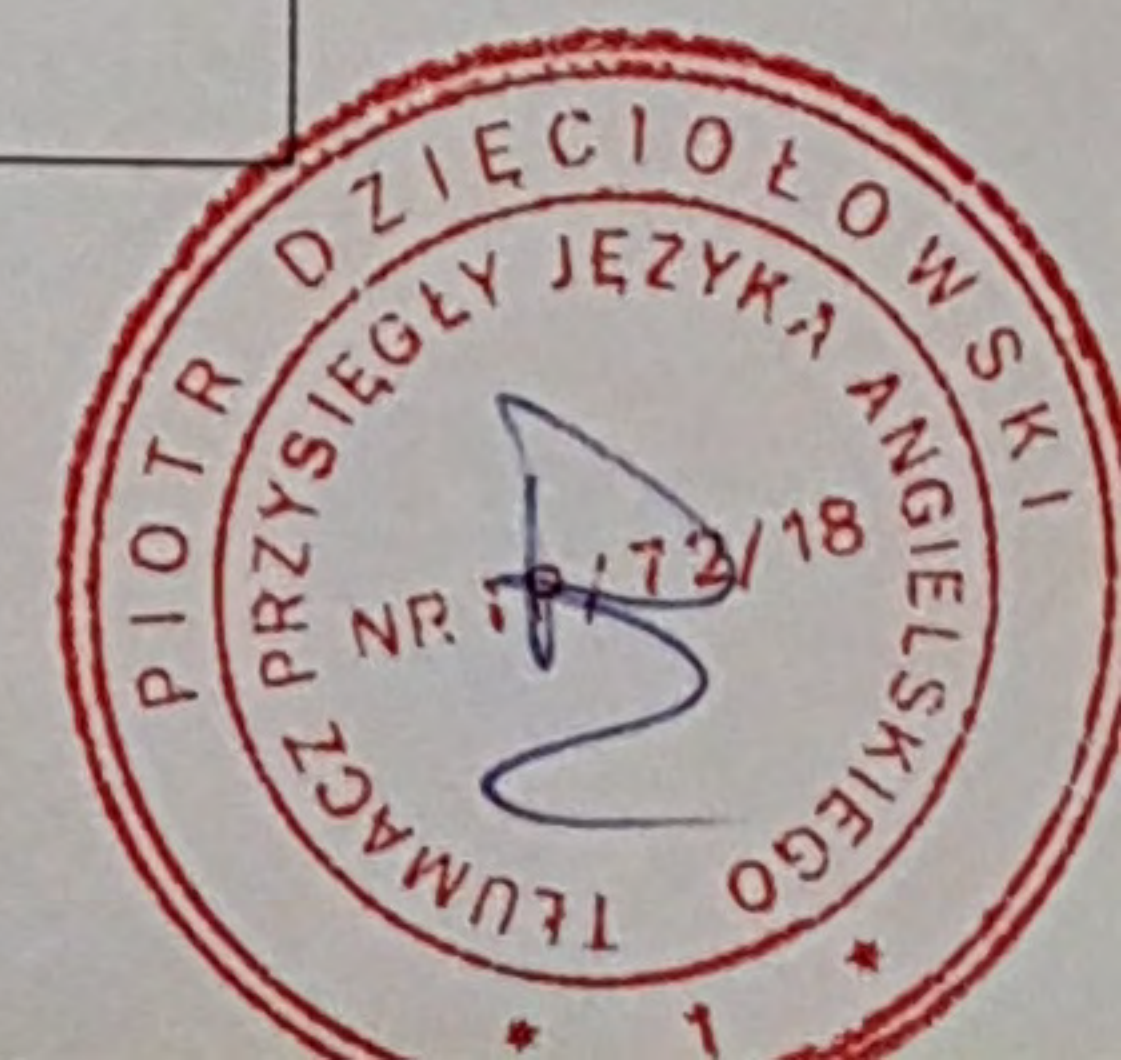
26/26; ITB-KOT-2019/0940 rev. 1---

[Logo of the Research Building Institute]---

Characteristic load bearing capacity values for W-LDB and WK-LDB wall supports---

Table C11---

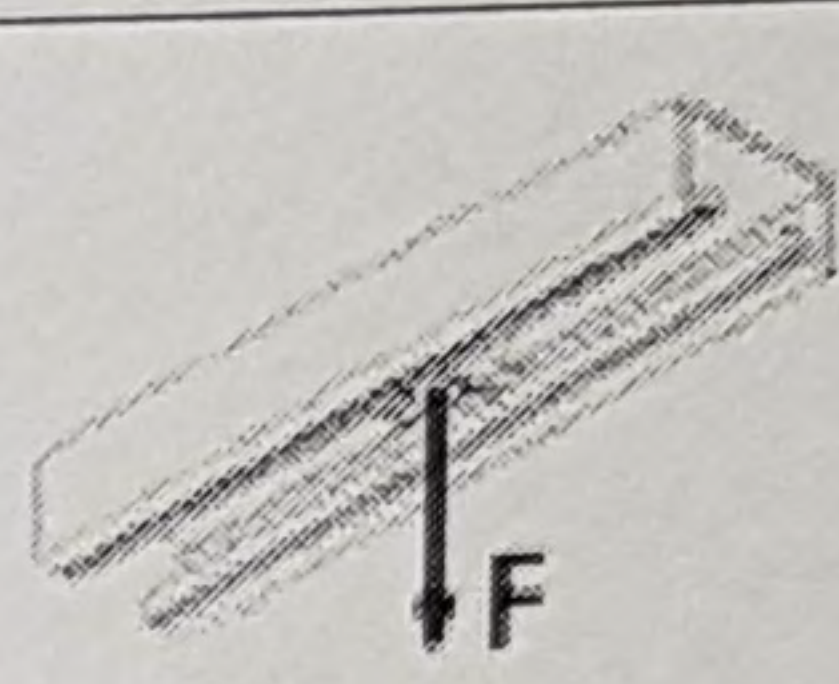
Item No.	l, mm	Characteristic load bearing capacity for deflection of l/100, N		Force action diagram
		W-LDB-30-30	WK-LDB-30-30	
1	2	3	4	5
1.	150	705	-	
2.	200	529	-	
3.	250	423	-	
4.	300	353	-	
5.	350	302	-	
6.	400	264	3495	
7.	450	235	-	
8.	500	212	1942	
9.	550	192	-	
10.	600	176	1899	



11.	650	158	-	
12.	700	136	1324	
13.	750	119	-	

Characteristic load bearing capacity values for SNP, SNL and SNKL slide nuts---

Table C12---

Item No.	Thread	Characteristic load bearing capacity F, N		Force action diagram
		SNP, SNL, SNKL		
1	2	3		4
1.	M6	8700		
2.	M8	10100		
3.	M10	12700		
4.	M12	15800		

Breaking forces for PG threaded rods---

Table C13---

Item No.	Thread	Mechanical properties class according to PN-EN ISO 898-1:2013	Minimum tensile strength, $R_{m, min}$ N/mm ²	Breaking force $P = A_s \times R_{m, min}$ N
1	2	3	4	5
1.	M6	4.6	400	8040
2.	M8			14600
3.	M10			23200
4.	M12			33700

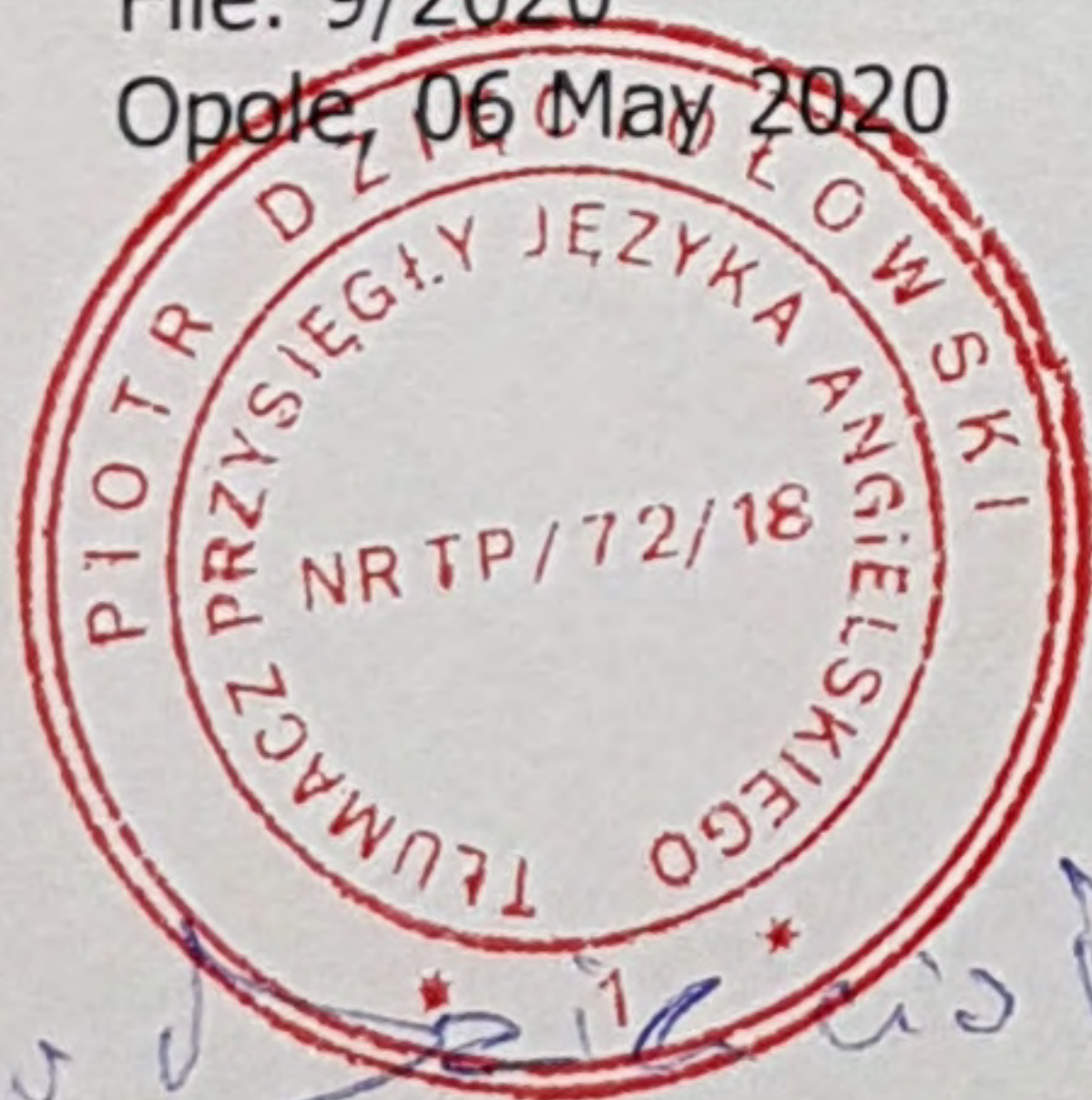
Appendix C to the National Technical Assessment No. ITB-KOT-2019/0940 rev. 1---

I, the undersigned, sworn translator of the English language with the seat in Opole hereby certify that the above is an exact and true translation of the document drawn in Polish language as presented to me.

Piotr Dzieciolowski, sworn translator of the English language entered into the list of sworn translators kept by the Minister of Justice under No. TP/72/18. In witness whereof, I have set my hand and seal of office.

File: 9/2020

Opole, 06 May 2020



Piotr Dzieciolowski